

Chapter : 14. STATISTICS

Exercise : 14A

Question: 1

Define statistics

Solution:

Statistics is a science which deals with collection, presentation, analysis and finally interpretation of numerical data.

Question: 2

Define some funda

Solution:

Fundamental characteristics of statistics are:-

- i) Data given or collected for a definite purpose can't be used for another purpose.
- ii) Numerical facts always constitute a specific data.
- iii) A single observation does not form data. Data should be aggregate of facts.
- iv) Qualitative characteristics cannot be measured numerically. Hence, they do not form Data.

Question: 3

What are primary

Solution:

Primary Data: A Data collected by the investigator himself with a definite plan in mind is called primary data.

Secondary Data: A data collected by someone, other than investigator is called secondary data.

Primary data are highly reliable than secondary data because they are collected by investigator himself with a definite plan in mind so they are more relevant. While secondary data are not being fully relevant to the investigation.

Question: 4

Explain the mean

Solution:

- (i) Variate:- Any character which consists of several values is called Variate.
- (ii) Class interval:- A Group in which Raw data is condensed is called class-interval.
- (iii) Class size:- The difference between true upper limit and true lower limit is termed as class-size.
- (iv) Class mark:- it is given as $\frac{\text{upper limit} + \text{lower limit}}{2}$
- (v) Class limit:- each class is bounded by two figures which termed as class limits.
- (vi) True class limits:- in exclusive form of distribution, true lower limit of a class is obtained by subtracting from lower limit and true upper limit is obtained by adding 0.5 to the upper limit.
- (vii) Frequency of a class:- Number of data values that fall in the range specified by that class is called frequency of that class.
- (viii) Cumulative frequency of a class:- The cumulative Frequency corresponding to that class is the sum of all frequencies up to and including that class.

Question: 5

Following data gi

Solution:

Minimum observation = 0

Maximum observation = 6

The classes of equal size covering the given data are:

0-2, 2-4, 4-6, 6-8

So, frequency distribution table will be as given below,

Class	Frequency
0 - 2	11
2 - 4	17
4 - 6	9
6 - 8	3

Question: 6

The marks obtaine

Solution:

Minimum observation = 1

Maximum observation = 24

The classes of equal size covering the given data are:

0-5, 5-10, 10-20, 20-25

So, frequency distribution table will be as given below,

Class	Frequency
0 - 5	6
5 - 10	10
10 - 15	8
15 - 20	8
20 - 25	8

Question: 7

Construct a frequ

Solution:

Minimum observation = 6

Maximum observation = 23

The classes of equal size covering the given data are:

6-9, 9-12, 12-15, 15-18, 18-21, 21-24, 24-27

So, grouped frequency table will be as given below,

Class	Frequency
6 - 9	5
9 - 12	5
12 - 15	4
15 - 18	6
18 - 21	3
21 - 24	7

Question: 8

Construct a frequ

Solution:

Minimum observation = 210

Maximum observation = 320

The classes of equal size covering the given data are:

210-230, 230-250, 250-270, 270-290, 290-310, and 310-330

So, frequency table will be as given below,

Class	Frequency
210 - 230	4
230 - 250	4
250 - 270	5
270 - 290	3
290 - 310	7
310 - 330	5

Question: 9

The weights (in g

Solution:

Minimum observation = 30

Maximum observation = 120

Frequency Table :-

Class	Frequency
30 - 40	4
40 - 50	6
50 - 60	3
60 - 70	5
70 - 80	9
80 - 90	6
90 - 100	2
100 - 110	3
110 - 120	2

Cumulative frequency table: -

Class	Frequency	Cumulative frequency
30 - 40	4	4
40 - 50	6	10
50 - 60	3	13
60 - 70	5	18
70 - 80	9	27
80 - 90	6	33
90 - 100	2	35
100 - 110	3	38
110 - 120	2	40

Question: 10

The weekly wages

Solution:

Minimum observation = 800

Maximum observation = 900

\therefore Range = $900 - 800 = 100$

Class size = 10

Number of classes = $\frac{100}{10} = 10$

Class	Frequency
800 - 810	3
810 - 820	2
820 - 830	1
830 - 840	8
840 - 850	5
850 - 860	1
860 - 870	3
870 - 880	1
880 - 890	1
890 - 900	5

Question: 11

The electricity b

Solution:

Minimum data = 52

Maximum data = 130

Range = $130 - 52 = 78$

Let the class size = 10

\therefore Number of classes = $\frac{78}{10} = 7.8$ or 8 classes

Class	Frequency
52 - 62	2
62 - 72	6
72 - 82	6
82 - 92	6
92 - 102	7
102 - 112	4
112 - 122	5
122 - 132	4

Question: 12

Following are the

Solution:

The Cumulative frequency table can be drawn as given below:

Age (in year)	No. of patients	Cumulative frequency
10 - 20	90	90
20 - 30	50	140
30 - 40	60	200
40 - 50	80	280
50 - 60	50	330
60 - 70	30	360

Question: 13

Present the follo

Solution:

Grouped frequency table can be drawn as shown below;

Marks	No. of students
0 - 10	5
10 - 20	7
20 - 30	20
30 - 40	8
40 - 50	5
50 - 60	3

Question: 14

Given below is a

Solution:

Frequency table can be represented as below;

Marks	No. of students
0 - 10	17
10 - 20	22
20 - 30	29
30 - 40	37
40 - 50	50
50 - 60	60

Question: 15

Make a frequency

Solution:

The frequency table can be represented as below:

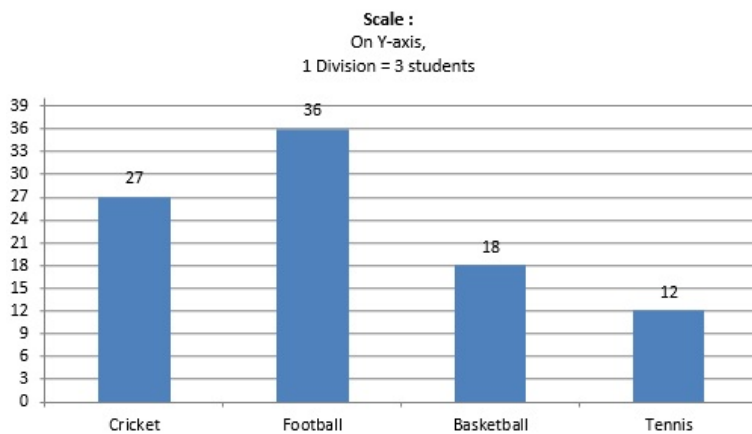
Marks obtained	No. of students
0 - 10	8
10 - 20	5
20 - 30	12
30 - 40	35
40 - 50	24
50 - 60	16

Exercise : 14B

Question: 1

The following tab

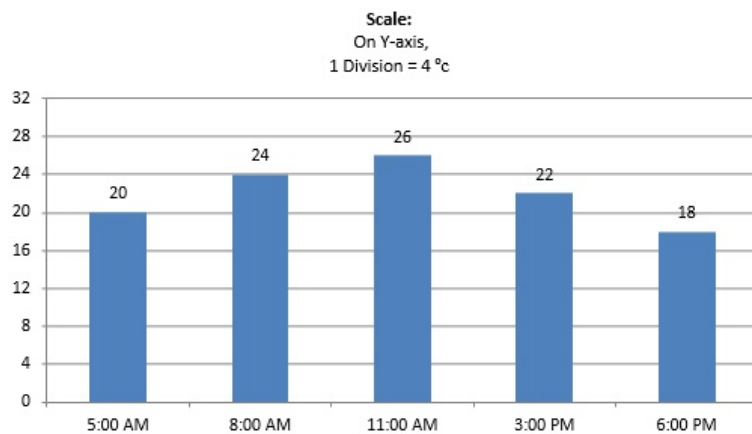
Solution:



Question: 2

On a certain day,

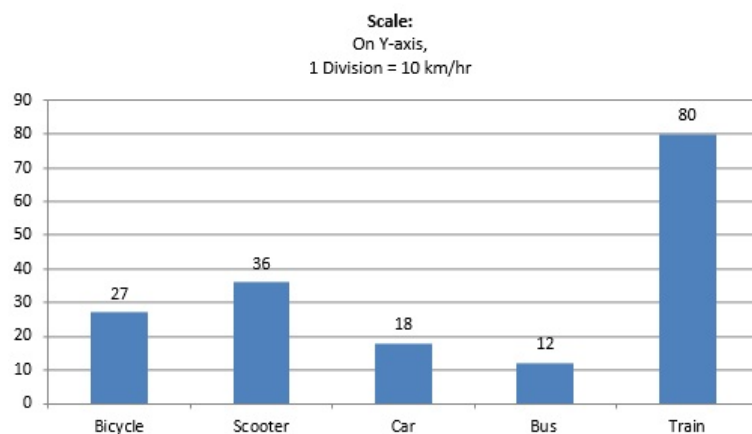
Solution:



Question: 3

The approximate v

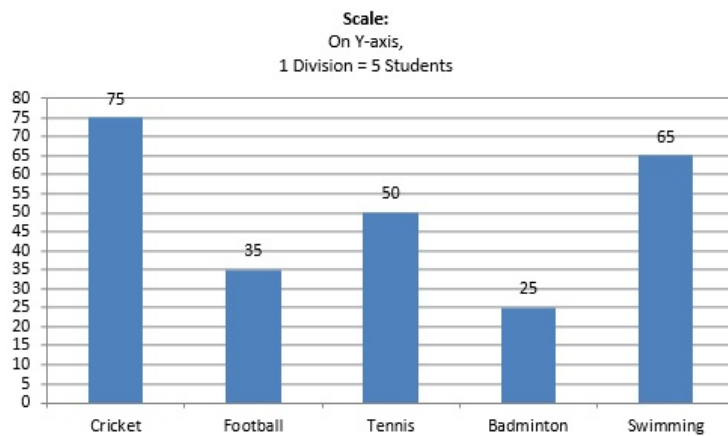
Solution:



Question: 4

The following tab

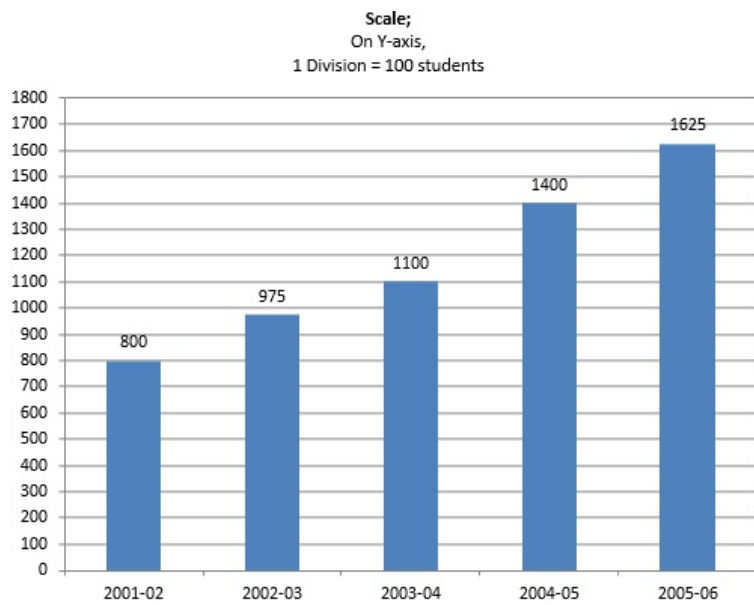
Solution:



Question: 5

Given below is a

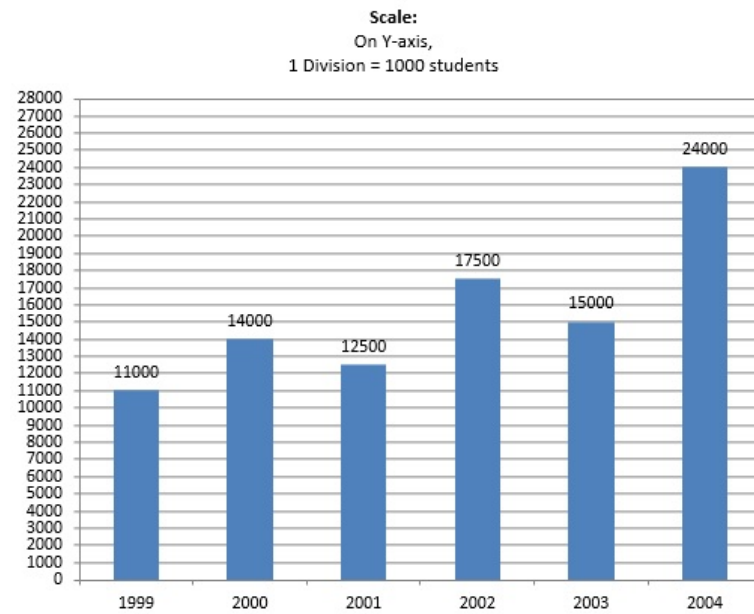
Solution:



Question: 6

The following tab

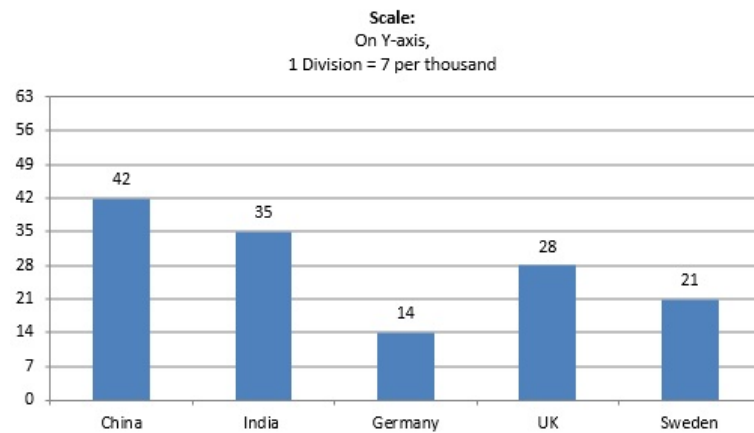
Solution:



Question: 7

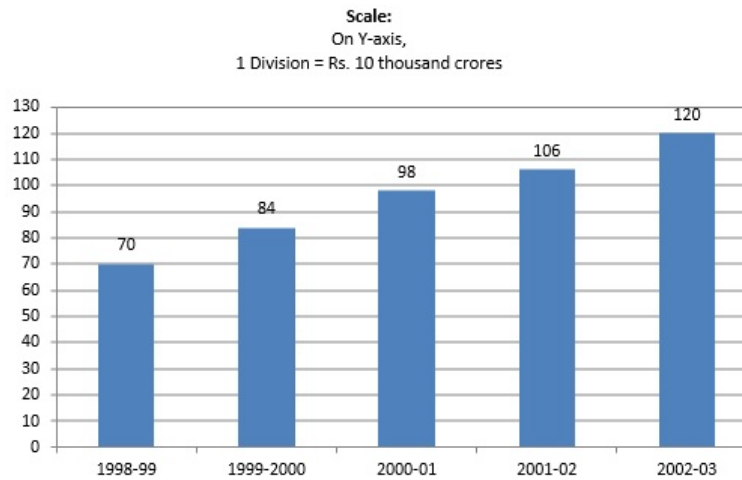
The birth rate pe

Solution:

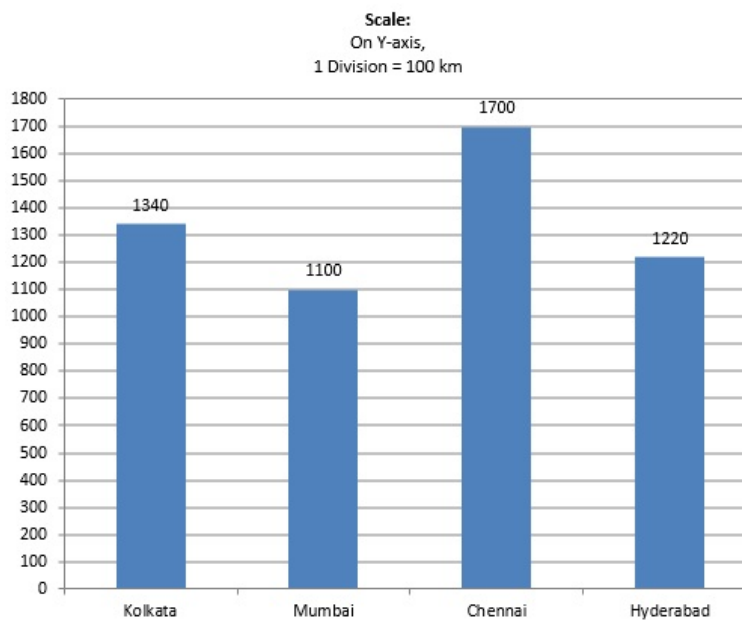


Question: 8

The following tab

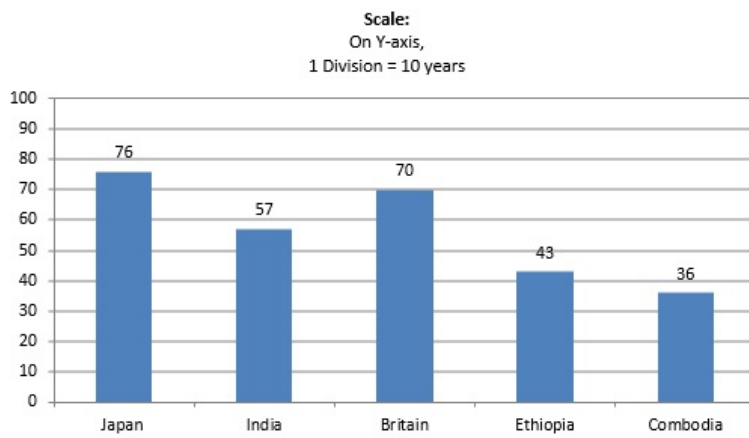
Solution:**Question: 9**

The air distances

Solution:**Question: 10**

The following tab

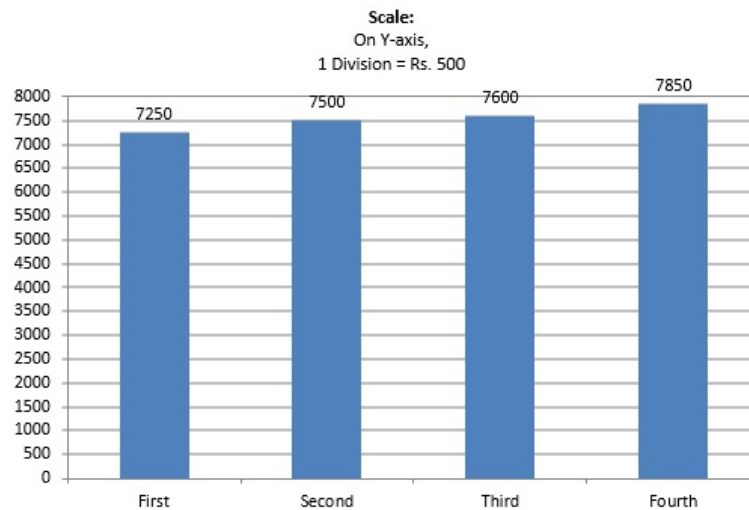
Solution:



Question: 11

Gold prices on 4

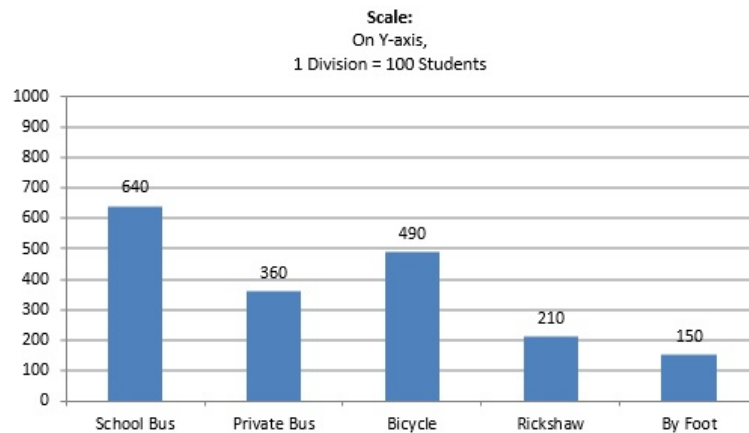
Solution:



Question: 12

Various modes of

Solution:



Question: 13

Look at the bar g

Solution:

- (i) The bar graph shows the marks obtained by a student in various subjects in an examination.
- (ii) The student scores very good in mathematics, as the height of the corresponding bar is the highest.

(iii) The student scores least marks in Hindi, as the height of the corresponding bar is the lowest.

(iv) Average marks = $\frac{\text{sum of marks}}{\text{no. of subjects}} = \frac{60 + 35 + 75 + 50 + 60}{5} = \frac{280}{5} = 56$.

Exercise : 14C

Question: 1

The daily wages o

Solution:

The given frequency distribution is in exclusive form, we will represent the class intervals along the X-axis and the corresponding frequency on the Y axis.

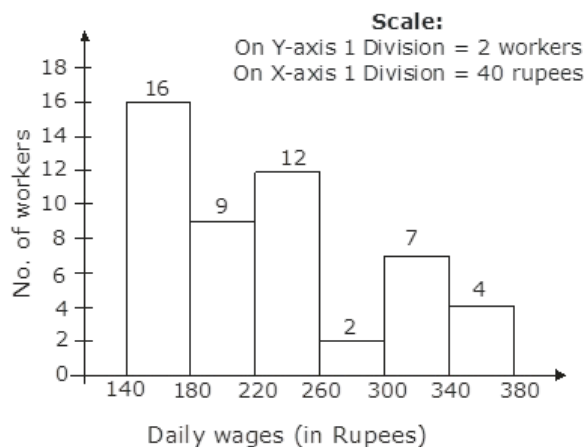
Now take the scale of,

1 big division = 40 rupees on X-axis,

1 big division = 2 workers on Y axis

We will draw the rectangles with the class intervals as basis and the corresponding frequency as the height.

Thus, we get the following histogram.



Question: 2

The following tab

Solution:

The given frequency distribution is in exclusive form, we will represent the class intervals along the X-axis and the corresponding frequency on the Y axis.

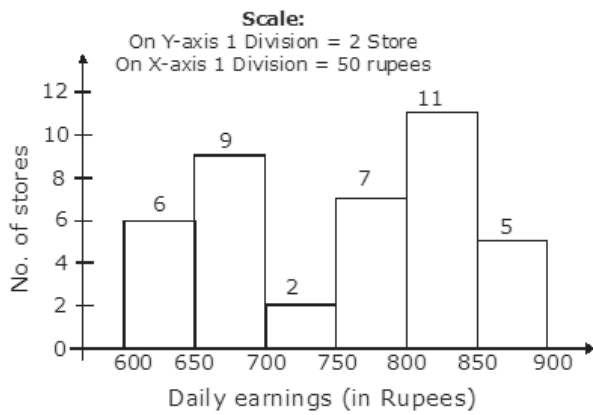
Now take the scale of,

1 big division = 50 rupees on X-axis,

1 big division = 1 store on Y axis

We will draw the rectangles with the class intervals as basis and the corresponding frequency as the height.

Thus, we get the following histogram.



Question: 3

The heights of 75

Solution:

The given frequency distribution is in exclusive form, we will represent the class intervals along the X-axis and the corresponding frequency on the Y axis.

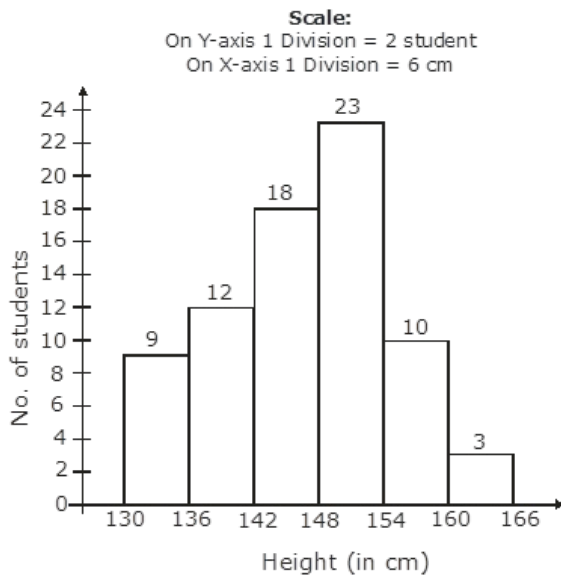
Now take the scale of,

1 big division = 6cm on X-axis,

1 big division = 2 students on Y axis

We will draw the rectangles with the class intervals as basis and the corresponding frequency as the height.

Thus, we get the following histogram.



Question: 4

Draw a histogram

Solution:

The given frequency distribution is in exclusive form, we will represent the class intervals along the X-axis and the corresponding frequency on the Y axis.

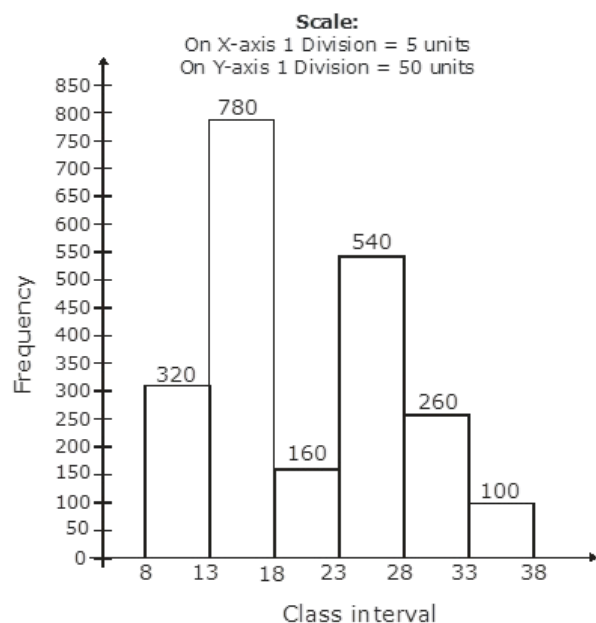
Now take the scale of,

1 big division = 5 units on X-axis,

1 big division = 50 units on Y axis

We will draw the rectangles with the class intervals as basis and the corresponding frequency as the height.

Thus, we get the following histogram.



Question: 5

Construct a histo

Solution:

The given frequency distribution is in inclusive form. So, convert it in Exclusive form.

Class interval	Frequency
4.5-12.5	6
12.5-20.5	15
20.5 - 28.5	24
28.5 - 36.5	18
36.5 - 44.5	4
44.5 - 52.5	9

We will represent the class intervals along the X-axis and the corresponding frequency on the Y axis.

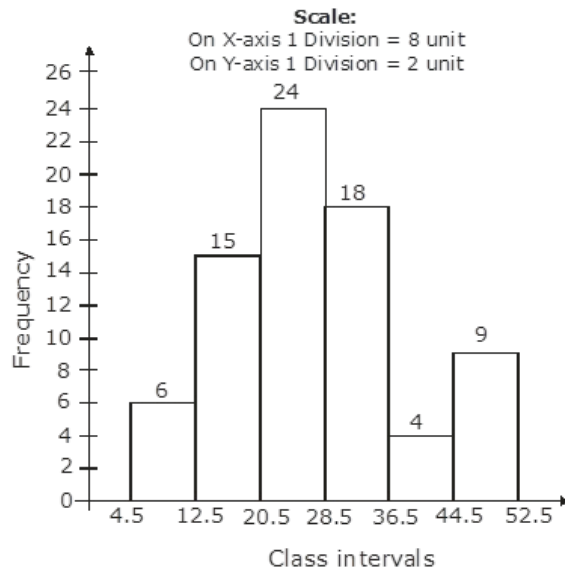
Now take the scale of,

1 big division = 8 units on X-axis,

1 big division = 2 units on Y axis

We will draw the rectangles with the class intervals as basis and the corresponding frequency as the height.

Now, we get following Histogram:



Question: 6

The following tab

Solution:

We will represent the class intervals along the X-axis and the corresponding frequency on the Y axis.

Now take the scale of,

1 big division = 7 years on X-axis,

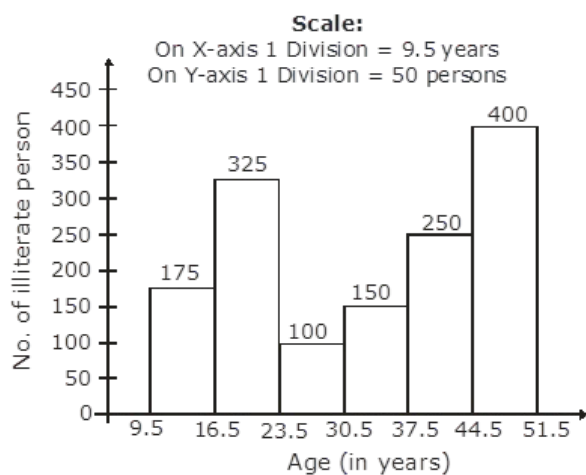
1 big division = 50 person on Y axis

We will draw the rectangles with the class intervals as basis and the corresponding frequency as the height.

The given frequency distribution is in inclusive form. So, convert it in Exclusive form.

Age (in years)	No. of illiterate person
9.5 - 16.5	175
16.5 - 23.5	325
23.5 - 30.5	100
30.5 - 37.5	150
37.5 - 44.5	250
44.5 - 51.5	400
51.5 - 58.5	525

Histogram as shown below:



Question: 7

Draw a histogram

Solution:

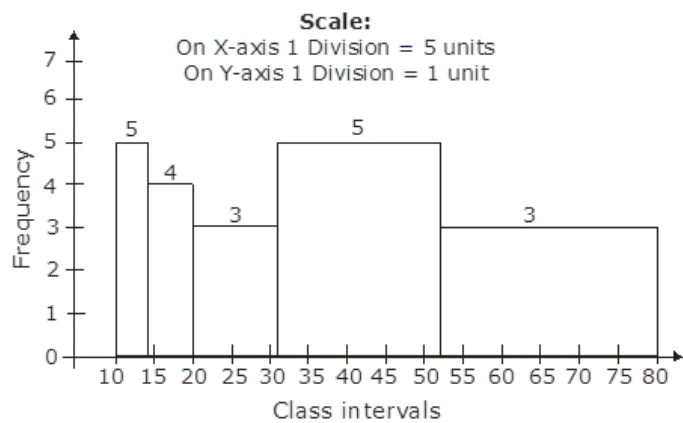
In the given frequency distribution, Class sizes are different.

So, we calculate adjusted frequency for each class, As, minimum class size = 4

Adjusted frequency of a class = $\frac{\text{Minimum class size}}{\text{class size of the class}} \times \text{its frequency}$

Class interval	Frequency	Adjusted Frequency
10 - 14	5	$\frac{4}{4} \times 5 = 5$
14 - 20	6	$\frac{4}{6} \times 6 = 6$
20 - 32	9	$\frac{4}{12} \times 9 = 3$
32 - 52	25	$\frac{4}{20} \times 25 = 5$
52 - 80	21	$\frac{4}{28} \times 21 = 3$

Histogram is as follows:



Question: 8

In a study of dia

Solution:

Let's take two classes interval, first at beginning (0-10) and second at the end (70-80) each with frequency zero.

Now we can draw the frequency table with the help of these two classes,

Age in years	Class marks	Frequency
0-10	5	0
10-20	15	2
20-30	25	5
30-40	35	12
40-50	45	19
50-60	55	9
60-70	65	4
70-80	75	0

Now plot the following points on the graph,

A (5,0)

B (15,2)

C (25, 5)

D (35, 12)

E (45, 19)

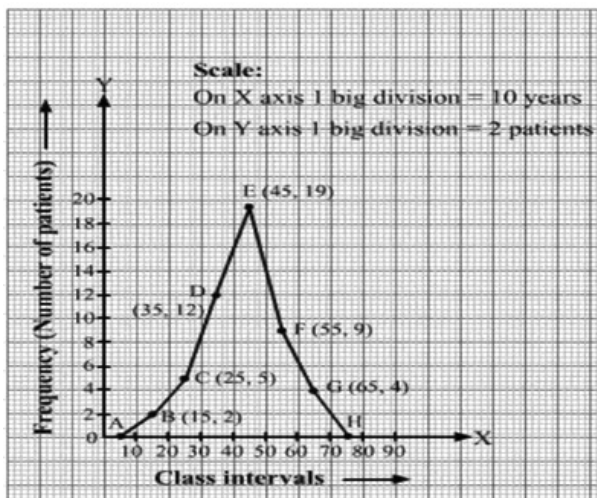
F (55, 9)

G (65, 4)

H (75,0)

Join the points with line segments

AB, BC, CD, DE, EF, FG, GH, to obtain required frequency polygon. As shown in the figure.



Question: 9

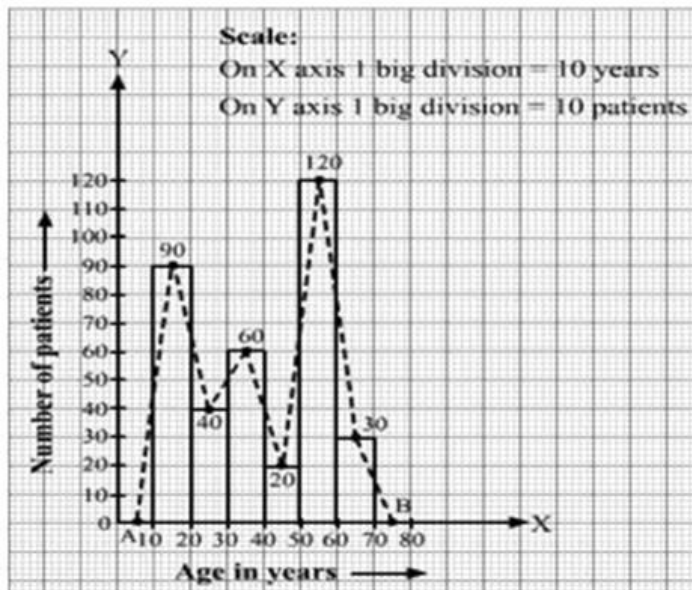
The ages (in year

Solution:

We take imagined class 0 - 10 and 70 - 80, each with frequency zero. The class marks of above classes are 5 and 75 respectively.

So, we plot the points A (5,0) and B (75,0). We join A with the midpoint of the top of the first rectangle and B with the mid-point of the last rectangle.

Thus we obtain a complete frequency polygon,



Question: 10

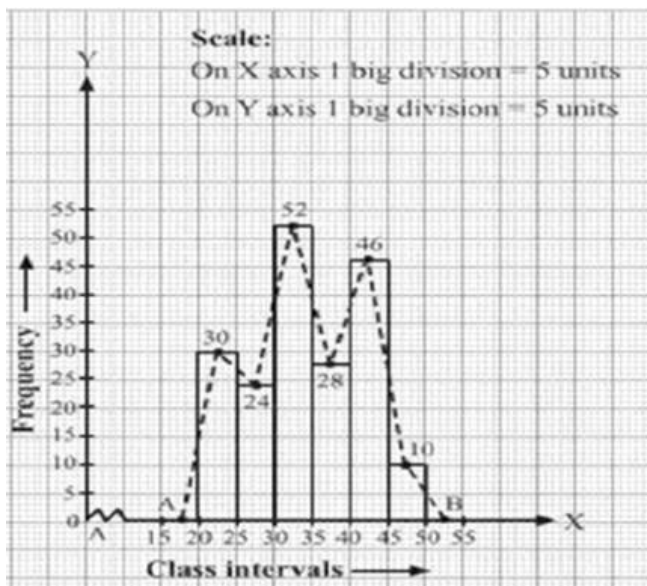
Draw a histogram

Solution:

We take imagined class 15-20 and 0-55, each with frequency 0. The class marks of above classes are 17.5 and 52.5 respectively.

So, we plot the points A (17.5, 0) and B (52.5, 0). We join A with the midpoint of the top of the first rectangle and B with the mid-point of the last rectangle.

Thus we obtain a complete frequency polygon,



Question: 11

Draw a histogram

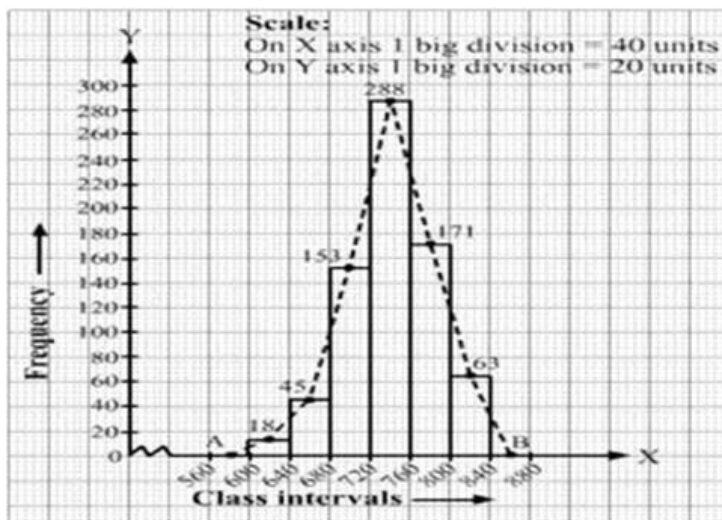
Solution:

We take imagined class 560-600 and 840-880, each with frequency 0. The class marks of above classes are 5 and 75 respectively.

As we can see in the figure the x-axis starts at 560, a break is indicated near the origin to show that the graph is drawn with a scale beginning at 560, not at origin.

So, we plot the points A (580, 0) and B (860, 0). We join A with the midpoint of the top of the first rectangle and B with the mid-point of the last rectangle.

Thus we obtain a complete frequency polygon,



Question: 12

Draw a frequency

Solution:

We take the imagined classes (-9, 0) at the beginning and (61-70) at the end, each of the frequency 0.

Thus we have,

Class interval	Class marks	Frequency
-9 - 0	-4.5	0
1 - 10	5.5	8
11 - 20	15.5	3
21 - 30	25.5	6
31 - 40	35.5	12
41 - 50	45.5	2
51 - 60	55.5	7
61 - 70	65.5	0

We plot the following points on the graph,

A (-4.5, 0)

B (5.5, 8)

C (15.5, 3)

D (25.5, 6)

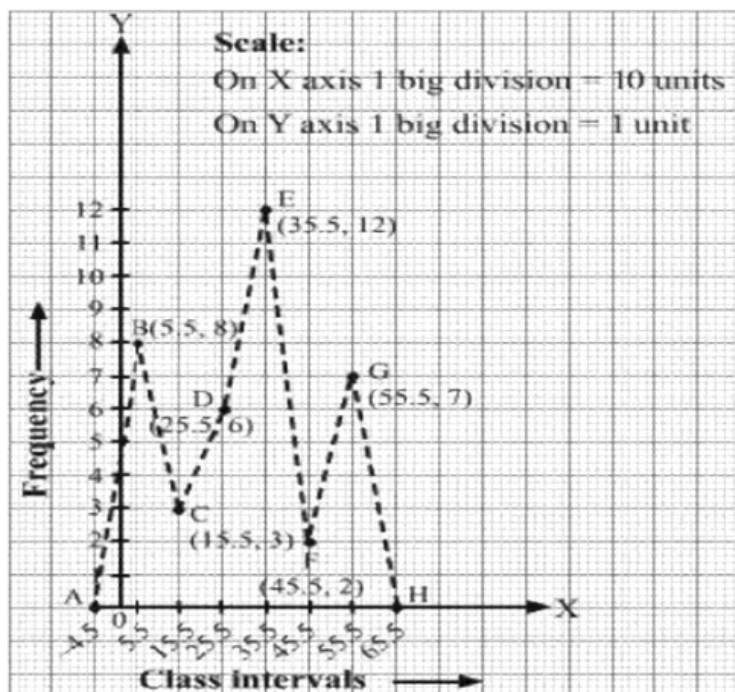
E (35.5, 12)

F (45.5, 2)

G (55.5, 7)

H (65.5, 0)

Now we draw the line segment AB, BC, CD, DE, EF, FG, GH, to obtain the frequency polygon.



Exercise : 14D

Question: 1

Find the arithmet

Solution:

(i) First eight natural no's are = 1,2,3,4,5,6,7,8

Sum of these numbers = $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 = 36$

Arithmetic Mean = $\frac{\text{sum of eight natural numbers}}{\text{total numbers}} = \frac{36}{8} = 4.5$.

(ii) First ten odd numbers are = 1,3,5,7,9,11,13,15,17,19

Sum of these numbers = $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 = 100$

Arithmetic Mean = $\frac{\text{sum of these odd numbers}}{\text{total numbers}} = \frac{100}{10} = 10$.

(iii) First five prime numbers are = 2,3,5,7,11

Sum of these numbers = $2 + 3 + 5 + 7 + 11 = 28$

Arithmetic Mean = $\frac{\text{sum of numbers}}{\text{total number}} = \frac{28}{5} = 5.6$

(iv) First six even numbers are = 2,4,6,8,10,12

Sum of these numbers = $2 + 4 + 6 + 8 + 10 + 12 = 42$

Arithmetic Mean = $\frac{\text{sum of numbers}}{\text{total numbers}} = \frac{42}{6} = 7$.

(v) First seven multiples of 5 are = 5,10,15,20,25,30,35

Sum of these numbers = $5 + 10 + 15 + 20 + 25 + 30 + 35 = 140$

Arithmetic Mean = $\frac{\text{sum of numbers}}{\text{total numbers}} = \frac{140}{7} = 20$

(vi) All factors of 20 are = 1,2,4,5,10,20

Sum of numbers = $1 + 2 + 4 + 5 + 10 + 20 = 42$

Arithmetic Mean = $\frac{\text{sum of numbers}}{\text{total numbers}} = \frac{42}{6} = 7$

Question: 2

The number of chi

Solution:

Sum of numbers of children in families = $2 + 4 + 3 + 4 + 2 + 0 + 3 + 5 + 1 + 6 = 30$

Total number of family = 10

Mean number of children per family = $\frac{\text{sum of numbers of children}}{\text{total no. of family}} = \frac{30}{10} = 3.$

Question: 3

The following are

Solution:

Sum of numbers of books issued in a week = $105 + 216 + 322 + 167 + 273 + 405 + 346 = 1632$

Total number of days = 7

No. of books issued per day = $\frac{\text{sum of numbers of books in a week}}{\text{no. of days in week}} = \frac{1632}{7} = 262.$

Question: 4

The daily minimum

Solution:

Sum of temperature during whole week = $35.5 + 30.8 + 27.3 + 32.1 + 23.8 + 29.9 =$

Total number of days = 6

Mean temperature = $\frac{\text{sum of temperature during whole week}}{\text{no. of days}} = \frac{179.4}{6} = 29.9^\circ\text{F}.$

Question: 5

The percentage of

Solution:

Sum of percentage of marks = $64 + 36 + 47 + 23 + 0 + 19 + 81 + 93 + 72 + 35 + 3 + 1 = 474$

Number of students = 12

Mean percentage of marks = $\frac{\text{sum of marks}}{\text{no. of student}} = \frac{474}{12} = 39.5.$

Question: 6

If the arithmetic

Solution:

Sum of numbers = $7 + 9 + 11 + 13 + x + 21 = 61 + x$

Number of observation = 6

Arithmetic Mean = $\frac{\text{sum of numbers}}{\text{no. of observations}}$

$$= 13 = \frac{61 + x}{6}$$

$$= 61 + x = 13 \times 6 = 78$$

$$= x = 78 - 61 = 17.$$

Question: 7

The mean of 24 nu

Solution:

Given,

Mean of 24 numbers = 35

Sum of these numbers = $24 \times 35 = 840$.

Every number is increased by 3,

Total increment = $24 \times 3 = 72$

New sum = $840 + 72 = 912$

New Mean = $\frac{\text{new sum}}{\text{total numbers}} = \frac{912}{24} = 38$.

Question: 8

The mean of 20 nu

Solution:

Given,

Mean of 20 numbers = 43

Sum of these numbers = $20 \times 43 = 860$

When, every number is decreased by 6,

Total decrease in sum = $20 \times 6 = 120$

New sum will be = $860 - 120 = 740$

New Mean = $\frac{\text{New sum}}{\text{total numbers}} = \frac{740}{20} = 37$.

Question: 9

The man of 15 num

Solution:

Given,

Mean of 15 numbers = 27

Sum of these numbers = $15 \times 27 = 405$

When, every number is multiplied by 4,

The new sum becomes = $405 \times 4 = 1620$

New Mean = $\frac{\text{New sum}}{\text{total numbers}} = \frac{1620}{15} = 108$.

Question: 10

The mean of 12 nu

Solution:

Given,

Mean of 12 numbers = 40

Sum of these numbers = $12 \times 40 = 480$

When each number is divided by 8

The new sum becomes = $\frac{480}{8} = 60$.

New mean = $\frac{\text{new sum}}{\text{total numbers}} = \frac{60}{12} = 5$.

Question: 11

The mean of 20 nu

Solution:

Given,

Mean of 20 numbers = 18.

Sum of these numbers = $20 \times 18 = 360$.

When 3 is added to each of the first ten numbers,

Total increment in sum = $10 \times 3 = 30$.

New sum becomes = $360 + 30 = 390$

Mean of New set of numbers = $\frac{\text{New sum of numbers}}{\text{total numbers}} = \frac{390}{20} = \frac{39}{2} = 19.5$.

Question: 12

The mean weight o

Solution:

Given,

Mean weight of 6 boys = 48 kg

Sum of their weights = $6 \times 48 = 288$ kg

Sum of weight of 5 boys = $51 + 45 + 49 + 46 + 44 = 235$ kg

Hence,

Weight of sixth boy = total weight - weight of 5 boys = $288 - 235 = 53$ kg.

Question: 13

The mean of the m

Solution:

Given,

Mean of marks of 50 students = 39

Sum of marks = $50 \times 39 = 1950$

It is given that he misread 43 as 23, so,

Correct sum = Sum obtained + $(43 - 23) = 1950 + 20 = 1970$.

Correct Mean = $\frac{\text{correct sum}}{\text{total number of students}} = \frac{1970}{50} = 39.4$

Question: 14

The mean of 100 i

Solution:

Given,

Mean of 100 items = 64

Sum of items = $100 \times 64 = 6400$.

It is given that 26 and 9 were misread as 36 and 90, so,

Correct sum = $6400 + (36 - 26) + (90 - 9) = 6400 + 91 = 6491$

Correct Mean = $\frac{\text{correct sum}}{\text{total numbers of items}} = \frac{6491}{100} = 64.91$.

Question: 15

The mean of six n

Solution:

Given,

Mean of 6 numbers = 23

Sum of numbers = $23 \times 6 = 138$

Mean of 5 numbers = 20 (Given)

Sum of 5 numbers = $20 \times 5 = 100$

So,

The excluded number = Sum of 6 numbers - Sum of 5 numbers = $138 - 100 = 38$.

Exercise : 14E

Question: 1

The mean mark obt

Solution:

Given,

Mean marks of 7 students = 226

Total marks of 7 students = $7 \times 226 = 1582$

Total marks of 6 students = $(340 + 180 + 260 + 56 + 275 + 307)$

Marks of the 7th students = (total marks of 7 students) - (total marks of 6 students)
 $= 1582 - 1418 = 164$

Hence the marks of the 7th student are 164.

Question: 2

The mean weight o

Solution:

Mean weight of 34 students = 46.5kg

Total weight of 34 students = $34 \times 46.5 = 1581$ kg

If the weight of a teacher is included then mean arises = 500gm = 0.5 kg

So new mean = $46.5 + 0.5 = 47$ kg

Total weight = $47 \times 35 = 1645$ kg

Weight of a teacher = $1645 - 1581 = 64$ kg

Hence the weight of a teacher is 64 kg.

Question: 3

The mean weight o

Solution:

Mean weight of 36 students = 41kg

Total weight of 36 students = $36 \times 41 = 1476$ kg

If one student leaves the class then mean decreases = 200gm = 0.2 kg

So new mean = $41 - 0.2 = 40.8$ kg

Total weight of 35 students = $40.8 \times 35 = 1428$ kg

Weight of the student = $1476 - 1428 = 48$ kg

Hence the weight of the student who left the class is 48 kg.

Question: 4

The average weigh

Solution:

Mean weight of 39 students = 40kg

Total weight of 39 students = $39 \times 40 = 1560$ kg

If a new student is admitted to the class, the average decrease by = $200\text{g} = 0.2$ kg

So new average weight = $40 - 0.2 = 39.8$ kg

Total weight of 39 students and 1 new student = $39.8 \times 40 = 1592$ kg

Weight of new student = $1592 - 1560 = 32$ kg

Hence the weight of the new student is 32 kg.

Question: 5

The average month

Solution:

Average monthly salary of 20 workers = 7650 Rs

Total salary of 20 workers per month = $20 \times 7650 = 153000$ Rs

The wage of one member of the group = 8100 Rs

New average salary of 20 workers and manager = 8200 per month

Let suppose salary of manager is x

The new average (20 workers + manager) = $\frac{153000 + x}{21} = 8200$ (given)

$$= 153000 + x = 8200 \times 21$$

$$153000 + x = 172200$$

$$x = 172200 - 153000$$

$$x = 19200 \text{ Rs}$$

Hence salary of manager is 19200Rs.

Question: 6

The average month

Solution:

Average monthly wage of 10 persons = 9,000Rs

Total wage of 10 person = $10 \times 9000 = 90,000$ Rs

The wage of one member of the group = 8100 Rs

When one member leaves the group then total wage of 9 person = $90000 - 8100$ Rs

The wage of new member = 7200 Rs

When new member join to the group then total wage of 10 person = $81900 + 7200 = 89100$ Rs

$$\text{New monthly average} = \frac{\text{new total wage of 10 person}}{\text{no. of persons}} = \frac{89100}{10} = 8910 \text{ Rs}$$

Hence new monthly average is 8910 Rs.

Question: 7

The average month

Solution:

Average monthly consumption of petrol for 7 months = 330 liters

Total consumption for 7 months = $7 \times 330 = 2310$ liters

Average consumption for next 5 months = 270 liters

Total consumption for next 5 months = $5 \times 270 = 1350$ liters

Total consumption during whole year = $2310 + 1350 = 3660$ liters

Now,

Average consumption per month during whole year = $\frac{\text{Total consumption during whole year}}{\text{no. of months in a year}}$

$$= \frac{3660}{12} = 305 \text{ liter/per month}$$

Question: 8

Find the mean of

Solution:

Mean of 15 numbers = 18

Sum of 15 numbers = $18 \times 15 = 270$

Mean of remaining 10 numbers = 13

Sum of remaining 10 numbers = $10 \times 13 = 130$

Mean of 25 numbers = $\frac{\text{sum of 15 numbers} + \text{sum of 10 number}}{25}$

$$= \frac{270 + 130}{25} = \frac{400}{25} = 16$$

Hence mean of 25 numbers is 16.

Question: 9

The mean weight o

Solution:

Mean weight of 60 students = 52.75 kg

Sum of weight of 60 students = $60 \times 52.75 = 3165$ kg

Mean weight of 25 students of them = 51kg

Sum of weight of 25 students = $51 \times 25 = 1275$ kg

Sum of weight of remaining 35 students = Sum of weight of 60 students - Sum of weight of 25 students

$$= 3165 - 1275 = 1890 \text{ kg}$$

Mean of remaining 35 students = $\frac{\text{Sum of weight of 35 students}}{35} = \frac{1890}{35} = 54\text{kg}$

Hence mean of remaining students is 54kg.

Question: 10

The average weigh

Solution:

Let the average weight of 10 oarsmen be x kg

Sum of weight of 10 oarsmen = $10x$ kg

When new man is added to the crew in place of another man then the average increases by = 1.5 kg

So, new average weight = $(x + 1.5)\text{kg}$

$$\text{New average weight} = \frac{\text{sum of weight of 10 oarsmen} - 58 \text{ kg} + \text{weight of new man}}{10}$$

$$x + 1.5 = \frac{10x - 58 + \text{weight of new man}}{10}$$

$$10x - 58 + \text{weight of new mean} = 10(x + 1.5)$$

$$10x - 58 + \text{weight of new mean} = 10x + 15$$

$$\text{Weight of new mean} = 15 + 10x - 10x + 58$$

$$\text{Weight of new mean} = 73 \text{ kg}$$

Hence Weight of the new man in the crew is 73kg.

Question: 11

The mean of 8 num

Solution:

$$\text{Mean of 8 numbers} = 35$$

$$\text{Sum of 8 numbers} = 8 \times 35 = 280$$

$$\text{New mean} = 35 - 3 = 32$$

$$\text{Sum of 7 numbers} = 32 \times 7 = 224$$

$$\text{Excluded number} = \text{sum of 8 numbers} - \text{sum of 7 numbers}$$

$$= 280 - 224 = 56$$

So, the excluded number is 56.

Question: 12

The mean of 150 i

Solution:

$$\text{Calculated mean of 150 items} = 60$$

$$\text{Incorrect sum of 150 items} = 60 \times 150 = 9000$$

$$\text{Correct sum of 150 items} = (\text{incorrect sum}) - (\text{incorrect items}) + (\text{correct items})$$

$$= 9000 - (52 + 8) + (152 + 88)$$

$$= 9000 - 60 + 240$$

$$= 9240 - 60 = 9180$$

$$\text{Correct mean} = \frac{\text{correct sum}}{150} = \frac{9180}{150} = \frac{918}{15} = 61.2$$

So, correct mean is 61.2.

Question: 13

The mean of 31 re

Solution:

$$\text{Mean of 31 results} = 60$$

$$\text{Sum of 31 results} = 31 \times 60 = 1860$$

$$\text{Mean of first 16 results} = 58$$

$$\text{Sum of first 16 results} = 58 \times 16 = 928$$

$$\text{Mean of last 16 results} = 62$$

$$\text{Sum of last 16 results} = 62 \times 16 = 992$$

$$16^{\text{th}} \text{ result} = \text{sum of first 16}^{\text{th}} \text{ results} + \text{sum of last 16 results} - \text{sum of 31 results}$$

$$= 992 + 928 - 1860 = 60$$

So, 16th result is 60.

Question: 14

The mean of 11 nu

Solution:

Given,

$$\text{Mean of 11 number} = 42$$

$$\text{So, Sum of numbers} = 11 \times 42 = 462.$$

$$\text{Mean of first 6 numbers} = 37.$$

$$\text{Hence, sum of first six numbers} = 6 \times 37 = 222.$$

$$\text{Mean of last 6 numbers} = 46$$

$$\text{Sum of last 6 numbers} = 6 \times 46 = 276.$$

So,

$$\text{The 6}^{\text{th}} \text{ number} = (\text{sum of first 6 numbers and last 6 numbers}) - (\text{Sum of 11 numbers})$$

$$= (222 + 276) - 462 = 498 - 462 = 36.$$

The 6th number is 36.

Question: 15

The mean weight o

Solution:

Given,

$$\text{Mean weight of 25 students} = 52 \text{ kg}$$

$$\text{Total weight of 25 students} = 25 \times 52 = 1300 \text{ kg}$$

$$\text{Mean weight of first 13 students} = 48 \text{ kg}$$

$$\text{Total weight of First 13 students} = 13 \times 48 = 624 \text{ kg}$$

$$\text{Mean weight of last 13 students} = 55 \text{ kg}$$

$$\text{Total weight of last 13 students} = 13 \times 55 = 715 \text{ kg}$$

So,

$$\text{Weight of 13}^{\text{th}} \text{ student} = (\text{sum of weight of first 13 and last 13 students}) - (\text{wt. of 25 students})$$

$$= (624 + 715) - 1300 = 1339 - 1300 = 39 \text{ kg}$$

Hence, Weight of 13th student = 39 kg.

Question: 16

The mean score of

Solution:

Given,

$$\text{Mean score of 25 observations} = 80$$

$$\text{Total score of 25 observations} = 25 \times 80 = 2000.$$

$$\text{Mean score of another 55 observations} = 60$$

$$\text{Total score of 55 observations} = 55 \times 60 = 3300.$$

$$\text{Total observations} = 55 \times 25 = 80$$

$$\text{Mean score of whole set of observations} = \frac{\text{total score of 25 observations \& 55 observations}}{\text{total number of observations}}$$

$$= \frac{2000 + 3300}{80} = \frac{5300}{80} = \frac{530}{8} = 66.25.$$

Hence, Mean score of whole set is 66.25.

Question: 17

Arun scored 36 marks

Solution:

Given,

Marks obtained in English = 36

Marks obtained in Hindi = 44

Marks obtained in Maths = 75

Marks obtained in Science = x

Average marks of all subjects = 50

We know that,

$$\text{Average marks} = \frac{\text{sum of marks in all subjects}}{\text{No. of subjects}} = \frac{36 + 44 + 75 + x}{4}$$

$$= 50 = \frac{36 + 44 + 75 + x}{4}$$

$$= 50 \times 4 = 155 + x$$

$$= x = 200 - 155 = 45.$$

Hence, Marks in science = 45.

Question: 18

The mean monthly

Solution:

Given,

Mean salary of 75 workers = Rs.5680

Total salary of 75 workers = $75 \times 5680 = \text{Rs.}426000$

Mean salary of 25 workers of them = Rs.5400

Total salary of 25 workers = $25 \times 5400 = \text{Rs.}135000$

Mean salary of 30 workers in them = Rs.5700

Total salary of 30 workers = $30 \times 5700 = \text{Rs.}171000$

Let Mean salary of remaining 20 workers = Rs. X

Total salary of 20 workers will be = Rs.20x

So, we have,

Salary of 75 workers = salary of (25 workers + 30 workers + 20 workers)

$$426000 = 135000 + 171000 + 20x$$

$$= 20x = 426000 - 306000 = 120000$$

$$= x = \frac{120000}{20} = 6000.$$

Hence, Salary of 20 workers = Rs.6000.

Question: 19

A ship sails out

Solution:

Given,

Speed of ship in sailing direction (x) = 15 km/h

Speed of ship in sailing back (y) = 10 km/h

So, By using direct formula,

$$\text{Average speed of ship in whole journey} = \frac{2xy}{x+y} = \frac{2 \times 15 \times 10}{25} = \frac{300}{25} = 12 \text{ km/h}$$

Hence, Average speed of ship = 12 km/h

Question: 20

There are 50 stud

Solution:

Given,

Average weight of 50 students in class = 44 kg

Total weight of 50 students = $50 \times 44 = 2200$ kg

Number of girls = 50 - number of boys = $50 - 40 = 10$

Average weight of 10 girls = 40 kg

Total weight of 10 girls = $10 \times 40 = 400$ kg

Hence,

Total weight of 40 boys in class = total weight of class - weight of girls

$$= 2200 - 400 = 1800 \text{ kg}$$

$$\text{Average weight of boys} = \frac{\text{total weight}}{\text{number of boys}} = \frac{1800}{40} = 45 \text{ kg}$$

Hence, Average weight of 40 boys = 45 kg.

Exercise : 14F

Question: 1

Find the mean of

Solution:

Let's draw the table and calculate the total frequency.

To calculate mean we need the relative value of variables which is $x_i \times f_i$. To attain $x_i \times f_i$ we have to multiply the value of variables (x_i) to the frequency of the value (f_i).

Daily wages (in Rs) (x_i)	No. of workers (f_i)	($x_i \times f_i$)
90	12	1080
110	14	1540
120	13	1560
130	11	1430
150	10	1500
	$\Sigma f_i = 60$	$\Sigma x_i \times f_i = 7110$

By putting the formula of;

$$\text{Mean} = \frac{\Sigma f_i \times x_i}{\Sigma f_i}$$

$$= \frac{7110}{60} = \frac{711}{6}$$

$$= 118.50$$

Question: 2

The following tab

Solution:

Let's draw the table and calculate the relative value of variables.

Weight (in kg) (x_i)	No. of workers (f_i)	($x_i \times f_i$)
60	4	240
63	3	189
66	2	132
69	2	138
72	1	72
	$\Sigma f_i = 12$	$\Sigma x_i \times f_i = 771$

By putting the formula of mean we get;

$$\text{Mean} = \frac{\Sigma f_i \times x_i}{\Sigma f_i} = \frac{771}{12}$$

$$= 64.25 \text{ kg}$$

So the mean weight of the workers will be 64.25kg.

Question: 3

The following dat

Solution:

Let's draw the table and calculate the relative value of variables $\Sigma x_i \times f_i$

Age (in years) (x_i)	Frequency (f_i)	($x_i \times f_i$)
15	3	45
16	8	128
17	9	153
18	11	198
19	6	114
20	3	60
	$\Sigma f_i = 40$	$\Sigma x_i \times f_i = 698$

By putting the formula of mean we get;

$$\text{Mean} = \frac{\Sigma f_i \times x_i}{\Sigma f_i} = \frac{698}{40}$$

$$= 17.45 \text{ years}$$

So the mean age of the students will be 17.45years.

Question: 4

Find the mean of

Solution:

Let's draw the table and calculate the relative value of variables.

Variables (x_i)	frequency (f_i)	($x_i \times f_i$)
10	7	70
30	8	240
50	10	500
70	15	1050
89	10	890
	$\Sigma f_i = 50$	$\Sigma x_i \times f_i = 2750$

By putting the formula of mean we get;

$$\text{Mean} = \frac{\Sigma f_i \times x_i}{\Sigma f_i} = \frac{2750}{50} = \frac{275}{5}$$

$$= 55$$

So the mean of the given distribution will be 55.

Question: 5

If the mean of th

Solution:

Let's draw the table and calculate the relative value of variables $\Sigma x_i \times f_i$

(x_i)	(f_i)	$(x_i \times f_i)$
3	6	18
5	8	40
7	15	105
9	P	9P
11	8	88
13	4	52
	$\Sigma f_i = 41 + P$	$\Sigma x_i \times f_i = 303 + 9P$

By putting the formula of mean we get;

$$\text{Mean} = \frac{\Sigma f_i \times x_i}{\Sigma f_i} = 8 (\text{given})$$

So we have,

$$\frac{303 + 9P}{41 + P} = 8$$

$$303 + 9P = 8(41 + P)$$

$$303 + 9P = 328 + 8P$$

$$9P - 8P = 328 - 303$$

$$P = 25$$

Hence the value of the P is 25.

Question: 6

Find the missing

Solution:

Let's draw the table and calculate the relative value of variables $\Sigma x_i \times f_i$

(x_i)	(f_i)	$(x_i \times f_i)$
15	8	120
20	7	140
25	P	25P
30	14	420
35	15	525
40	6	240
	$\Sigma f_i = 50 + P$	$\Sigma x_i \times f_i = 1445 + 25P$

By putting the formula of mean we get;

$$\text{Mean} = \frac{\Sigma f_i \times x_i}{\Sigma f_i} = 28.25 \text{ (given)}$$

$$28.25 = \frac{1445 + 25P}{50 + P}$$

$$28.25(50 + P) = 1445 + 25P$$

$$28.25 \times 50 + 28.25 \times P = 1445 + 25P$$

$$1412.50 + 28.25P = 1445 + 25P =$$

$$28.25P - 25P = 1445 - 1412.50$$

$$3.25P = 32.5$$

$$P = \frac{32.5}{3.25} \times \frac{100}{10}$$

$$= \frac{3250}{325} = 10$$

Hence the value of P is 10.

Question: 7

Find the value of

Solution:

x_i	f_i	$x_i \times f_i$
8	12	96
12	16	192
15	20	300
P	24	24P
20	16	320
25	8	200
30	4	120
	$\Sigma f_i = 100$	$\Sigma x_i \times f_i = 1228 + 24P$

By putting the formula of mean we get;

$$\text{Mean} = \frac{\Sigma f_i \times x_i}{\Sigma f_i} = 16.6 \text{ (given)}$$

$$16.6 = \frac{1228 + 24P}{100}$$

$$16.6 \times 100 = 1228 + 24P$$

$$\frac{166 \times 100}{10} = 1228 + 24P$$

$$1660 = 1228 + 24P$$

$$24P = 1660 - 1228$$

$$24P = 432$$

$$P = \frac{432}{24} = 18$$

So, the value of P is 18.

Question: 8

Find the missing

Solution:

Let's draw the table and calculate the relative value of variables $\sum x_i \times f_i$

(x_i)	(f_i)	$(x_i \times f_i)$
10	17	170
30	f_1	$30f_1$
50	32	1600
70	f_2	$70f_2$
90	19	1710
	$\sum f_i = 68 + f_1 + f_2$	$\sum x_i \times f_i = 3480 + 30f_1 + 70f_2$

We have,

$$\sum f_i = 120 \text{ (given)}$$

$$\sum f_i = 68 + f_1 + f_2 = 120$$

$$f_1 + f_2 = 120 - 68$$

$$f_1 + f_2 = 52 \dots \text{Equation (i)}$$

Now we have,

$$\text{Mean} = 50 \text{ (given)}$$

$$\text{Mean} = \frac{\sum f_i \times x_i}{\sum f_i} = 50$$

$$50 = \frac{3480 + 30f_1 + 70f_2}{68 + f_1 + f_2}$$

$$50 \times 68 + f_1 + f_2 = 3480 + 30f_1 + 70f_2$$

$$3400 + 50f_1 + 50f_2 = 3480 + 30f_1 + 70f_2$$

$$50f_1 - 30f_1 + 50f_2 - 70f_2 = 3480 - 3400$$

$$20f_1 - 20f_2 = 80$$

$$20(f_1 - f_2) = 80$$

$$f_1 - f_2 = \frac{80}{20} = 4 \dots \text{Equation (ii)}$$

by adding equation (i) and (ii) we get,

$$\Sigma f_1 = 56$$

$$f_1 = \frac{56}{2} = 28$$

From equation (ii)

$$f_1 - f_2 = 4$$

$$28 - f_2 = 4$$

$$f_2 = 28 - 4 = 24$$

Hence missing frequencies are $f_1 = 28$ and $f_2 = 24$.

Question: 9

Use the *assume*

Solution:

Let assume mean be $A = 900$

Now we can arrange data in below format

Weekly wages (in Rs) (x_i)	No. of workers (f_i)	$d_i = x_i - A$	$f_i \times d_i$
800	7	-100	-700
820	14	-80	-1120
860	19	-40	-760
900	25	0	0
920	20	20	400
980	10	80	800
1000	5	100	500
	$\Sigma f_i = 100$		$\Sigma (d_i \times f_i) = -880$

We have,

$$\begin{aligned}
 \text{Mean} &= A + \frac{\sum f_i \times d_i}{\sum f_i} = 900 + \frac{-880}{100} \\
 &= 900 - \frac{880}{100} \\
 &= 900 - 8.80 \\
 &= 891.21
 \end{aligned}$$

Hence the mean is 891.21

Question: 10

Use the assume

Solution:

Let the assumed mean be $A = 67$

So, we arrange the given data as under :

Height (in cm) (x_i)	No. of plants (f_i)	$=d_i = x_i - A$	$= d_i \times f_i$
61	5	-6	-30
64	18	-3	-54
67	42	0	0
70	27	3	81
73	8	6	48
	$\sum f_i = 100$		$\sum x_i f_i = 45$

We know,

$$\text{Mean} = A + \frac{\sum f_i \times d_i}{\sum f_i} = 67 + \frac{45}{100} = 67 + 0.45 = 67.45.$$

Hence, The mean height of the plants = 67.45 cm.

Question: 11

Use the step-d

Solution:

Let the assumed mean be $A = 21$

$$= h = x_2 - x_1 = 19 - 18 = 1$$

Thus, we prepare the table given below:

x_i	f_i	$u_i = \frac{x_i - A}{1}$	$u_i \times f_i$
18	170	-3	-510
19	320	-2	-640
20	530	-1	-330
21	700	0	0
22	230	1	230
23	140	2	280
24	110	3	330
	$\Sigma f_i = 2200$		$\Sigma u_i \times f_i = -840$

We Know that,

$$\text{Mean} = A + \frac{\Sigma f_i \times u_i}{\Sigma f_i} \times h = 21 + \frac{-840}{2200} \times 1 = 21 - \frac{84}{220} = \frac{4620 - 84}{220} = \frac{4536}{220} = 20.62.$$

Hence, The Mean value of given distribution = 20.62.

Question: 12

The table given b

Solution:

Let the assumed Mean be $A = 1400$

$$= h = x_2 - x_1 = 600 - 200 = 400$$

Thus, we prepare the table as below:

Height (in meter)	No. of villages	$u_i = \frac{x_i - 1400}{400}$	$u_i \times f_i$
x_i	f_i		
200	142	-3	-426
600	265	-2	-530
1000	560	-1	-560
1400 = A	271	0	0
1800	89	1	89
2200	16	2	32
	$\Sigma f_i = 1343$		$\Sigma u_i \times f_i = -1395$

We know that,

$$\text{Mean} = A + \frac{\Sigma f_i \times u_i}{\Sigma f_i} \times h = 1400 + \frac{(-1395)}{1343} \times 400$$

$$= 1400 - \frac{558000}{1343} = \frac{1322200}{1343} = 984.51$$

Hence, The Mean height is 984.51.

Exercise : 14G

Question: 1

Find the median o

Solution:

To find median first we must arrange the data in either ascending order or descending order.(i)
By arranging the data in ascending order

We have;

2, 2, 3, 5, 7, 9, 9, 10, 11

Total number of observations, $N = 9$ (Odd number)

Since the No. 9 is odd so we apply the formula as

Median = value of the $\left(\frac{N+1}{2}\right)^{\text{th}}$ term

$$= \frac{9+1}{2} = \frac{10}{2} = 5$$

= value of 5th term

Median = 7

(ii) By arranging the data in ascending order

We have;

6, 8, 9, 15, 16, 18, 21, 22, 25

$N = 9$ (odd number)

Median = value of the $\left(\frac{N+1}{2}\right)^{\text{th}}$ term

$$= \frac{9+1}{2} = \frac{10}{2} = 5$$

= value of 5th term

Median = 16

(iii) By arranging the data in ascending order

We have;

6, 8, 9, 13, 15, 16, 18, 20, 21, 22, 25

$N = 11$ (Odd number)

Median = value of the $\left(\frac{N+1}{2}\right)^{\text{th}}$ term

$$= \frac{11+1}{2} = \frac{12}{2} = 6$$

= value of 6th term

Median = 16

(iv) By arranging the data in ascending order

We have;

0, 1, 2, 2, 3, 4, 4, 5, 5, 7, 8, 9, 10

$N = 13$ (Odd number)

Median = value of the $\left(\frac{N+1}{2}\right)^{\text{th}}$ term

$$= \frac{13+1}{2} = \frac{14}{2} = 7$$

= value of 7th term

Median = 4

Question: 2

Find the median o

Solution:

(i) By arranging the data in ascending order

9, 10, 17, 19, 21, 22, 32, 35

We have;

$N = 8$ (even number)

$$\begin{aligned}\text{Median} &= \frac{1}{2} \left[\text{size of } \left(\frac{N}{2} \right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1 \right)^{\text{th}} \text{ term} \right] \\ &= \frac{1}{2} [\text{size of the 4th term} + \text{size of the 5th term}] \\ &= \frac{1}{2} (19 + 21) = \frac{40}{2}\end{aligned}$$

$$\text{Median} = 20$$

(ii) By arranging the data in ascending order

29, 35, 51, 55, 60, 63, 72, 82, 85, 91

We have;

$$N = 10 \text{ (even number)}$$

$$\begin{aligned}\text{Median} &= \frac{1}{2} \left[\text{size of } \left(\frac{N}{2} \right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1 \right)^{\text{th}} \text{ term} \right] \\ &= \frac{1}{2} [\text{size of the 5th term} + \text{size of the 6th term}] \\ &= \frac{1}{2} (60 + 63) = \frac{123}{2}\end{aligned}$$

$$\text{Median} = 61.5$$

(iii) By arranging the data in ascending order

3, 4, 9, 10, 12, 15, 17, 27, 47, 48, 75, 81

We have;

$$N = 12 \text{ (even number)}$$

$$\begin{aligned}\text{Median} &= \frac{1}{2} \left[\text{size of } \left(\frac{N}{2} \right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1 \right)^{\text{th}} \text{ term} \right] \\ &= \frac{1}{2} [\text{size of the 6th term} + \text{size of the 7th term}] \\ &= \frac{1}{2} (15 + 17) = \frac{32}{2}\end{aligned}$$

$$\text{Median} = 16$$

Question: 3

The marks of 15 s

Solution:

By arranging the data in ascending order

We have;

17, 17, 19, 19, 20, 21, 22, 23, 24, 25, 26, 29, 31, 35, 40

$$N = 15 \text{ (odd number)}$$

$$\text{Median} = \text{value of the } \left(\frac{N+1}{2} \right)^{\text{th}} \text{ term}$$

$$= \frac{15+1}{2} = \frac{16}{2} = 8$$

$$= \text{value of } 8^{\text{th}} \text{ term}$$

$$= 23$$

Hence the Median marks are 23.

Question: 4

The heights (in c

Solution:

By arranging the data in ascending order

We have;

143.7, 144.2, 145, 146.5, 147.3, 148.5, 149.6, 150, 152.1

$N = 9$ (Odd number)

Median = value of the $\left(\frac{N+1}{2}\right)^{\text{th}}$ term

$$= \frac{9+1}{2} = \frac{10}{2} = 5$$

= value of 5th term

Median height = 147.3 cm

Question: 5

The weights (in k

Solution:

By arranging the weight in ascending order,

9.8, 10.6, 12.7, 13.4, 14.3, 15, 16.5, 17.2

We have;

$N = 8$ (even number)

$$\text{Median} = \frac{1}{2} \left[\text{size of } \left(\frac{N}{2}\right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1\right)^{\text{th}} \text{ term} \right]$$

$$= \frac{1}{2} [\text{size of the 4th term} + \text{size of the 5th term}]$$

$$= \frac{1}{2} (13.4 + 14.3) = \frac{27.7}{2}$$

Median weight = 13.85 kg

Question: 6

The ages (in year

Solution:

By arranging the ages of teachers in ascending order

32, 34, 36, 37, 40, 44, 47, 50, 53, 54

We have;

$N = 10$ (even number)

$$\text{Median} = \frac{1}{2} \left[\text{size of } \left(\frac{N}{2}\right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1\right)^{\text{th}} \text{ term} \right]$$

$$= \frac{1}{2} [\text{size of the 5th term} + \text{size of the 6th term}]$$

$$= \frac{1}{2} (40 + 44) = \frac{84}{2}$$

Median age = 42 years

Question: 7

If 10, 13, 15, 18

Solution:

By arranging the data in ascending order,

10, 13, 15, $x + 1$, $x + 3$, 30, 32, 35, 41

We have;

$N = 10$ (even number)

Median = 24 (given)

$$\text{Median} = \frac{1}{2} \left[\text{size of } \left(\frac{N}{2} \right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1 \right)^{\text{th}} \text{ term} \right]$$

$$24 = \frac{1}{2} [\text{size of the 5th term} + \text{size of the 6th term}]$$

$$24 = \frac{1}{2} [(x + 1) + (x + 3)]$$

$$48 = 2x + 4$$

$$2x = 44$$

$$x = 22$$

Hence the value of $x = 22$

Question: 8

Find the median w

Solution:

By arranging the data in ascending order,

Weight (in kg) (x)	Number of students (f)	Cumulative frequency
45	8	8
46	5	13
48	6	19
50	9	28
52	7	35
54	4	39
55	2	41
	N = 41	

$N = 41$ (odd number)

Median = value of the $\left(\frac{N+1}{2}\right)^{th}$ term

$$= \frac{41+1}{2} = \frac{42}{2} = 21$$

Median is the 21st term which is 50.

As we can see student from 20th to 28th comes under the weight of 50 so the median weight of the student is 50 kg.

Question: 9

Find the median f

Solution:

By arranging the data in the following format,

Variate (x)	Frequency (f)	Cumulative frequency
17	3	3
20	5	8
22	9	17
15	4	21
30	6	27
25	10	37
	N = 37	

$N = 37$ (odd number)

Median = value of the $\left(\frac{N+1}{2}\right)$ th term

$$= \frac{37+1}{2} = \frac{38}{2} = 19$$

Median is the 19th observation, which comes under the observations from 18th to 21st.

So the median value of observations is 22.

Question: 10

Calculate the med

Solution:

By arranging the data in table form,

Marks (x)	Number of students(f)	Cumulative frequency
9	4	4
20	6	10
25	16	26
40	8	34
50	7	41
80	2	43
	N = 43	

$N = 43$ (odd number)

Median = value of the $\left(\frac{N+1}{2}\right)$ th term

$$= \frac{43+1}{2} = \frac{44}{2} = 22$$

Median is the marks of 22nd student as we know students from 11th to 26th got 25 marks.

So the median value of observations is 25.

Question: 11

The heights (in c

Solution:

By arranging the data in ascending order,

Height (in cm) (x)	No. of students (f)	Cumulative frequency
151	6	6
152	3	9
153	12	21
154	4	25
155	10	35
156	8	43
157	7	50
	N = 50	

We have,

$N = 50$ (even number)

$$\text{Median} = \frac{1}{2} \left[\text{size of } \left(\frac{N}{2} \right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1 \right)^{\text{th}} \text{ term} \right]$$

$$= \frac{1}{2} [\text{size of the 25th student} + \text{size of the 26th student}]$$

As we can see height of 25th student is 154 and 26th student has the height of 155 cm

$$= \frac{1}{2} (154 + 155) = \frac{309}{2} = 154.5$$

So the median height is 154.5cm

Question: 12

Find the median f

Solution:

By arranging data in ascending order,

Variate (x)	Frequency (f)	Cumulative frequency
16	9	9
18	8	17
20	13	30
23	4	34
25	4	38
26	6	44
28	11	55
30	5	60
	N = 60	

We have,

$N = 60$ (even number)

$$\text{Median} = \frac{1}{2} \left[\text{size of } \left(\frac{N}{2} \right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1 \right)^{\text{th}} \text{ term} \right]$$

$$= \frac{1}{2} [\text{size of the 30th term} + \text{size of the 31st term}]$$

As we can see variate from 18th to 30th has the size of 20 and from 31st to 34th has the size of 23.

$$= \frac{1}{2} (20 + 23) = \frac{43}{2} = 21.5$$

Hence median is 21.5.

Exercise : 14H

Question: 1

Find the mode of

Solution:

By assigning the given data in ascending order

0, 0, 1, 2, 3, 4, 5, 6, 6, 6, 6

As we can clearly see that 6 has occurred maximum times, and we know that mode is the most appeared value in the set of data values, so 6 is the mode of the given data.

Question: 2

Determine the mod

Solution:

By arranging the given data in ascending order,

15, 20, 22, 23, 25, 25, 27, 40

As we can clearly see that 25 has occurred maximum times, so 25 is the mode of the given data.

Question: 3

Calculate the mod

Solution:

By arranging the given data in ascending order,

1, 1, 2, 3, 3, 4, 5, 5, 6, 6, 7, 8, 9, 9, 9, 9, 9

As we can clearly see that 9 has occurred maximum times, so 9 is the mode of the given data.

Question: 4

A cricket player

Solution:

By arranging the given data in ascending order,

9, 19, 27, 28, 30, 32, 35, 50, 50, 50, 50, 60

As we can clearly see that the player has scored 50 maximum times, so 50 is the modal of the given data.

To calculate mode by empirical method we have to arrange the data in the form of frequency table,

Values	Frequency
9	1
19	1
27	1
28	1
30	1
32	1
35	1
50	4
60	1

As we can see 50 has occurred the maximum times so 50 is the mode of the given data.

Question: 5

Calculate the mod

Solution:

By arranging the given data in ascending order we will get,

10, 10, 11, 11, 12, 12, 13, 14, 15, 17

Values (x)	Frequency (f)	Cumulative frequency	fx
10	2	2	20
11	2	4	22
12	2	6	24
13	1	7	13
14	1	8	14
15	1	9	15
17	1	10	17
	N = 10		$\Sigma fx = 125$

We have;

$N = 10$ (even number)

$$\text{Median} = \frac{1}{2} \left[\text{size of } \left(\frac{N}{2} \right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1 \right)^{\text{th}} \text{ term} \right]$$

$$= \frac{1}{2} [\text{size of the 5th term} + \text{size of the 6th term}]$$

$$= \frac{1}{2} (12 + 12)$$

$$\text{median} = \frac{24}{2} = 12$$

Now,

$$\Sigma fx = 125 \text{ and } \Sigma f = N = 10$$

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f} = \frac{125}{10} = 12.5$$

Hence,

$$\text{Mode} = 3(\text{median}) - 2(\text{mean})$$

$$= 3 \times 12 - 2 \times 12.5$$

$$= 36 - 25$$

$$= 11$$

Question: 6

Calculate the Mod

Solution:

We can draw the table in the given format. Then, we can calculate the Mode using the empirical formula.

Marks (x)	Number of students (f)	Cumulative frequency	Fx
10	3	3	30
11	5	8	55
12	4	12	48
13	5	17	65
14	2	19	38
16	3	22	48
19	2	24	38
20	1	25	20
	N = 25		$\Sigma fx = 332$

We have;

$N = 25$ (odd number)

Median = **value of $\left(\frac{N+1}{2}\right)$ th term**

= value of 13^{th} term

= 13

Now,

$\Sigma fx = 332$ and $\Sigma f = N = 25$

Mean = $\frac{\Sigma fx}{\Sigma f} = \frac{332}{25} = 13.28$

Hence,

Mode = $3(\text{median}) - 2(\text{mean})$

= $3 \times 13 - 2 \times 13.28$

$$= 39 - 26.56$$

$$= 12.44$$

Question: 7

We have;

$$N = 34 \text{ (even number)}$$

$$\text{Median} = \frac{1}{2} \left[\text{size of } \left(\frac{N}{2} \right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1 \right)^{\text{th}} \text{ term} \right]$$

$$= \frac{1}{2} [\text{size of the 17th term} + \text{size of the 18th term}]$$

$$= \frac{1}{2} (12 + 12)$$

$$\text{median} = \frac{24}{2} = 12$$

Now,

$$\sum fx = 407 \text{ and } \sum f = N = 34$$

$$\text{Mean} = \frac{\sum fx}{\sum f} = \frac{407}{34} = 11.97$$

Hence,

$$\text{Mode} = 3(\text{median}) - 2(\text{mean})$$

$$= 3 \times 12 - 2 \times 11.97$$

$$= 36 - 23.94$$

$$= 12.06$$

Question: 8

We have;

$$N = 40 \text{ (even number)}$$

$$\text{Median} = \frac{1}{2} \left[\text{size of } \left(\frac{N}{2} \right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1 \right)^{\text{th}} \text{ term} \right]$$

$$= \frac{1}{2} [\text{size of the 20th term} + \text{size of the 21st term}]$$

$$= \frac{1}{2} (30 + 30)$$

$$\text{median} = \frac{60}{2} = 30$$

Now,

$$\sum fx = 1161 \text{ and } \sum f = N = 40$$

$$\text{Mean} = \frac{\sum fx}{\sum f} = \frac{1161}{40} = 29.025$$

Hence,

$$\text{Mode} = 3(\text{median}) - 2(\text{mean})$$

$$= 3 \times 30 - 2 \times 29$$

$$= 90 - 58$$

$$= 32$$

Question: 9

The table given b

Solution:

Draw the table as below,

Weight in kg (x)	No. of person (f)	Cumulative frequency	Fx
42	3	3	126
47	8	11	376
52	6	17	312
57	8	25	456
62	11	36	682
67	5	41	335
72	9	50	648
	N = 50		$\Sigma fx = 2935$

We have;

$N = 50$ (even number)

$$\text{Median} = \frac{1}{2} \left[\text{size of } \left(\frac{N}{2} \right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1 \right)^{\text{th}} \text{ term} \right]$$

$$= \frac{1}{2} [\text{size of the 25th term} + \text{size of the 26th term}]$$

$$= \frac{1}{2} (57 + 62)$$

$$\text{median} = \frac{119}{2} = 59.5$$

Now,

$\Sigma fx = 2935$ and $\Sigma f = N = 50$

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f} = \frac{2935}{50} = 58.7$$

Hence,

$$\text{Mode} = 3(\text{median}) - 2(\text{mean})$$

$$= 3 \times 59.7 - 2 \times 58.7$$

$$= 179.1 - 117.4$$

$$= 61.1 \text{ kg}$$

Question: 10

The marks obtained

Solution:

We can draw the table as below,

Marks (x)	Number of students (f)	Cumulative frequency	Fx
4	8	8	32
12	10	18	120
20	16	36	320
28	24	60	672
36	15	75	540
44	7	80	308
	N = 80		$\Sigma fx = 1992$

We have;

$$N = 80 \text{ (even number)}$$

$$\text{Median} = \frac{1}{2} \left[\text{size of } \left(\frac{N}{2} \right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1 \right)^{\text{th}} \text{ term} \right]$$

$$= \frac{1}{2} [\text{size of the 40th term} + \text{size of the 41 term}]$$

$$= \frac{1}{2} (28 + 28)$$

$$\text{median} = \frac{56}{2} = 28$$

Now,

$$\Sigma fx = 1992 \text{ and } \Sigma f = N = 80$$

$$\text{Mean} = \frac{\sum fx}{\sum f} = \frac{1992}{80} = 24.9$$

Hence,

$$\text{Mode} = 3(\text{median}) - 2(\text{mean})$$

$$= 3 \times 28 - 2 \times 24.9$$

$$= 84 - 49.8$$

$$= 34.2$$

Question: 11

The ages of the e

Solution:

Draw the tables as given below,

Age in years (x)	No. of person (f)	Cumulative frequency	Fx
19	13	13	247
21	15	28	315
23	16	44	368
25	18	62	450
27	16	78	432
29	15	93	435
31	13	106	403
	N = 106		$\sum fx = 2650$

We have;

$$N = 106 \text{ (even number)}$$

$$\text{Median} = \frac{1}{2} \left[\text{size of } \left(\frac{N}{2} \right)^{\text{th}} \text{ term} + \text{size of the } \left(\frac{N}{2} + 1 \right)^{\text{th}} \text{ term} \right]$$

$$= \frac{1}{2} [\text{size of the 53rd term} + \text{size of the 54th term}]$$

$$= \frac{1}{2} (25 + 25)$$

$$\text{median} = \frac{50}{2} = 25$$

Now,

$$\Sigma fx = 2650 \text{ and } \Sigma f = N = 106$$

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f} = \frac{2650}{106} = 25$$

Hence,

$$\text{Mode} = 3(\text{median}) - 2(\text{mean})$$

$$= 3 \times 25 - 2 \times 25$$

$$= 75 - 50$$

$$= 25$$

Question: 12

The following tab

Solution:

Draw the table as below,

Weight in kg (x)	No. of students (f)	Cumulative frequency	Fx
47	4	4	188
50	3	7	150
53	2	9	106
56	2	11	112
60	4	15	240
	N = 15		$\Sigma fx = 796$

We have;

$$N = 15 (\text{Odd number})$$

$$\text{Median} = \text{value of the } \left(\frac{N+1}{2} \right) \text{th term}$$

= value of 8th term

$$= 53$$

Now,

$$\Sigma fx = 796 \text{ and } \Sigma f = N = 15$$

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f} = \frac{796}{15} = 53.06$$

Hence,

$$\text{Mode} = 3(\text{median}) - 2(\text{mean})$$

$$= 3 \times 53 - 2 \times 53.06$$

$$= 159 - 106.12$$

$$= 52.88$$

So, Mean, median and mode are 53, 53.06 and 52.88

Exercise : CCE QUESTIONS

Question: 1

The range of the

Solution:

Range = maximum value - minimum value

$$= 32 - 12 = 20$$

$$\square \text{Range} = 20$$

Question: 2

The class mark of

Solution:

Class interval = 100 - 120 (given)

We know that,

Class marks = $\frac{1}{2}$ (upper class limit + lower class limit)

$$= \frac{1}{2} (100 + 120) = \frac{1}{2} \times 220 = 110$$

So, Class marks = 110.

Question: 3

In the class inte

Solution:

The number 20 is included in class-interval 20 - 30,

Because,

Class interval 20 - 30 contains values, which are either equal to 20 or less than 30.

Question: 4

The class marks o

Solution:

Class marks = 20 (given)

$$\text{Class size} = 20 - 15 = 5$$

$$\text{Lower class limit} = (20 - \frac{5}{2}) = 20 - 2.5 = 17.5$$

$$\text{Upper class limit} = (20 + 5/2) = 20 + 2.5 = 22.5.$$

Hence,

Class mark 20 will lie in class 17.5 - 22.5

Question: 5

In a frequency di

Solution:

Let the upper limit of class = u

Let lower limit of class = l

Mild value = 10 (given)

We know that,

Mild value = $1/2 (u + l)$

$$10 = 1/2 (u + l)$$

$$= u + l = 20 \dots \dots \dots (i)$$

Width of class = 6 (given)

$$= u - l = 6 \dots \dots \dots (ii)$$

Subtracting equation (ii) from equation (i), we get,

$$2l = 14$$

$$= l = 14/2 = 7.$$

$$\therefore \text{lower limit} = 7.$$

Question: 6

Let m be the midp

Solution:

We know that,

Mid-point = $1/2 (\text{upper class limit} + \text{lower class limit})$

$m = 1/2 (\text{upper class limit} + \text{lower class limit})$

upper class limit = u (given)

$u + \text{lower class limit} = 2m$

lower class limit = $2m - u$.

Question: 7

The width of each

Solution:

Width of each class = 5 (given)

Total no. Of classes = 5 (given)

Lower class limit of lowest class = 10 (given)

$$\therefore \text{Total width of class} = 5 \times 5 = 25$$

$$\therefore \text{upper class limit of highest class} = 10 + 25 = 35.$$

Question: 8

Let L be the lowe

Solution:

Given,

Mid-point of class = m

We know that,

Mid-point = $\frac{1}{2}(\text{upper class limit} + \text{lower class limit})$

$m = \frac{1}{2}(\text{upper class limit} + \text{lower class limit})$

lower class limit = l (given)

upper class limit + $l = 2m$

upper class limit = $2m - l$.

Question: 9

The mid-value of

Solution:

Given,

Mid value of class interval = 42

Class size = 10

Let the upper limit of class = u

Let lower limit of class = l

We know that,

Mid value = $\frac{1}{2}(u + l)$

$42 = \frac{1}{2}(u + l)$

$= u + l = 84 \dots \dots \dots (i)$

Class size = $u - l$

$= u - l = 10$ (given)

Adding equation (ii) & equation (i), we get,

$2u = 94$

$\Rightarrow u = 94/2 = 47$.

From equation (ii)

$u - l = 10$

$l = 47 - 10 = 37$.

Question: 10

If the mean of f_i

Solution:

Mean of 5 observations = $\frac{\text{sum of observations}}{\text{no. of observation}}$

$\Rightarrow \text{Mean} = \frac{x + x + 2 + x + 4 + x + 6 + x + 8}{5}$

Mean = 11 (given)

$= \frac{x + x + 2 + x + 4 + x + 6 + x + 8}{5} = 11$

$\Rightarrow 5x + 20 = 55$

$\Rightarrow 5x = 55 - 20 = 35$

$$\Rightarrow x = \frac{35}{5} = 7.$$

Question: 11

If the mean of x ,

Solution:

$$\text{Mean of 5 observations} = \frac{\text{sum of observations}}{\text{no. of observation}}$$

$$\Rightarrow \text{Mean of 5 observations} = \frac{x+x+3+x+5+x+7+x+10}{5}$$

$$\Rightarrow \text{Mean} = 9 \text{ (given)}$$

$$\Rightarrow \frac{x+x+3+x+5+x+7+x+10}{5} = 9$$

$$\Rightarrow 5x + 25 = 45$$

$$\Rightarrow 5x = 45 - 25 = 20$$

$$\Rightarrow x = \frac{20}{5} = 4.$$

Now,

$$\text{Mean of three observations} = \frac{(x+5) + (x+7) + (x+10)}{3}$$

$$\Rightarrow \text{Mean} = \frac{(4+5) + (4+7) + (4+10)}{3}$$

$$\Rightarrow \text{Mean} = \frac{34}{3}$$

$$\Rightarrow \text{Mean} = 11\frac{1}{3}.$$

Question: 12

If

Solution:

$$\text{Mean of } x_1, x_2, x_3, \dots, x_n = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

$$\Rightarrow \text{Mean of } x_1, x_2, x_3, \dots, x_n = \bar{X} \dots \dots \dots (i)$$

Now,

$$\Rightarrow \sum_{i=1}^n (x_i - \bar{X})$$

$$= \sum_{i=1}^n x_i - \bar{X} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n} - \bar{X}$$

$$\Rightarrow \bar{X} - \bar{X} = 0.$$

Question: 13

If each observati

Solution:

Let the observations be $x_1, x_2, x_3, \dots, x_n$

$$\text{Mean} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n} = \bar{X} \dots \dots (i)$$

If each observation is increased by 5, we get,

$$x_1 + 5, x_2 + 5, x_3 + 5, \dots, x_n + 5$$

$$\text{New mean} = \frac{x_1 + 5 + x_2 + 5 + x_3 + 5 + \dots + x_n + 5}{n}$$

$$\Rightarrow \text{New mean} = \frac{x_1 + x_2 + x_3 + \dots + x_n + 5 \times n}{n}$$

$$\Rightarrow \text{Mean} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n} + \frac{5n}{n}$$

$$\Rightarrow \text{Mean} = \bar{x} + 5$$

Thus, the mean is also increased by 5.

Question: 14

Let

Solution:

$$\frac{x_1 + x_2 + x_3 + \dots + x_n}{n} = \bar{x} \text{ (given).....(i)}$$

$$\frac{y_1 + y_2 + y_3 + \dots + y_n}{n} = \bar{y} \text{ (given).....(ii)}$$

Now, their combined mean is,

$$\begin{aligned} &= \left(\frac{x_1 + x_2 + x_3 + \dots + x_n}{n} + \frac{y_1 + y_2 + y_3 + \dots + y_n}{n} \right) \\ &= \frac{x_1 + x_2 + x_3 + \dots + x_n + y_1 + y_2 + y_3 + \dots + y_n}{2n} \\ &= \frac{1}{2} \left[\frac{x_1 + x_2 + x_3 + \dots + x_n}{n} + \frac{y_1 + y_2 + y_3 + \dots + y_n}{n} \right] \end{aligned}$$

From equation (i) and eq.(ii)..

$$= \frac{1}{2}(\bar{x} + \bar{y})$$

Question: 15

If

Solution:

$$\text{It is given that } \frac{x_1 + x_2 + x_3 + \dots + x_n}{n} = \bar{x} \dots (i)$$

$$\text{Required mean} = \frac{(ax_1 + ax_2 + ax_3 + \dots + ax_n) + \left(\frac{x_1}{a} + \frac{x_2}{a} + \frac{x_3}{a} + \dots + \frac{x_n}{a} \right)}{2n}$$

$$\Rightarrow \text{Mean} = \frac{(ax_1 + ax_2 + ax_3 + \dots + ax_n)}{2n}$$

$$\Rightarrow \text{Mean} = \frac{1}{2} \left[\frac{a(x_1 + x_2 + x_3 + \dots + x_n)}{n} + \frac{x_1 + x_2 + x_3 + \dots + x_n}{an} \right]$$

From equation (i)

$$\Rightarrow \text{Mean} = \frac{1}{2} \left[a\bar{x} + \frac{1}{a}\bar{x} \right]$$

$$\Rightarrow \text{Mean} = \frac{\bar{x}}{2} \left(a + \frac{1}{a} \right)$$

Question: 16

If

Solution:

$$\text{Sum of all terms} = n_1\bar{x}_1 + n_2\bar{x}_2 + n_3\bar{x}_3 \dots \dots + n_n\bar{x}_n$$

$$\text{Total number of factors} = n_1 + n_2 + n + \dots + n_n$$

$$\therefore \text{Required mean} = \frac{n_1 \bar{x}_1 + n_2 \bar{x}_2 + n_3 \bar{x}_3 + \dots + n_n \bar{x}_n}{n_1 + n_2 + n + \dots + n_n}$$

$$\frac{\sum_{i=1}^n n_i \bar{x}}{\sum_{i=1}^n n_i}.$$

Question: 17

The mean weight o

Solution:

Given:

Mean weight of 6 boys = 48 kg

Let the weight of the 6th boy = x kg

Mean weight = $\frac{\text{sum of wieght}}{\text{number of boys}}$

$$\Rightarrow \text{Mean weight} = \frac{51 + 45 + 49 + 46 + 44 + x}{6}$$

$$= 48 = \frac{235 + x}{6}$$

$$= 235 + x = 48 \times 6 = 288$$

$$= x = 288 - 235 = 53 \text{ kg}$$

Hence, the weight of the 6th boy = 53 kg.

Question: 18

The mean of the m

Solution:

Given,

No. of students = 50

Mean marks secured by them = 39

\therefore Incorrect sum of marks secured = $39 \times 50 = 1950$.

Correct sum = incorrect sum - (incorrect marks) + correct marks

$$= 1950 - 23 + 43 = 1970$$

$$\text{Correct mean} = \frac{1970}{50} = 39.4.$$

Question: 19

The mean of 100 i

Solution:

Given,

No. of items = 100

Mean of them = 64

\therefore Incorrect sum of 100 items = $64 \times 100 = 6400$.

Correct sum = incorrect sum - (incorrect marks) + correct marks

$$= 6400 - (26 + 9) + (36 + 90)$$

$$6400 - 35 + 126 = 6491.$$

$$\text{Correct mean} = \frac{6491}{100} = 64.91.$$

Question: 20

The mean of 100 o

Solution:

Given:

No. of observations = 100

Mean of them = 50

Sum of observations = $100 \times 50 = 5000$

It is given that one of observation 50, is replaced by 150.

New sum = $5000 - 50 + 150 = 5100$.

Resulting mean = $\frac{\text{new sum}}{100} = \frac{5100}{100} = 51$

Question: 21

The mean of 25 ob

Solution:

Mean of 25 observations 36.

Sum of 25 observations = $25 \times 36 = 900$.

Mean of first 13 observations = 32

Sum of first 13 observations = $13 \times 32 = 416$.

Means of last 13 observations = 40

Sum of last 13 observations = $13 \times 40 = 520$.

Hence,

13^{th} observation = (sum of first 13 observation + sum of last 13 observations) - sum of 25 observations.

13^{th} observation = $416 + 520 - 900 = 936 - 900 = 36$

Hence, 13^{th} observation = 36.

Question: 22

There are 50 numb

Solution:

Let's take 50 numbers as = n_1, n_2, \dots, n_{50}

And mean = x

Then sum = $50x$

Now each number is subtracted from 53,

We have,

$53 - n_1, 53 - n_2, \dots, 53 - n_{50}$

Sum becomes = $53 \times 50 - (n_1 + n_2 + \dots + n_{50})$

Given Mean = - 3.5

So,

$$\frac{53 \times 50 - (n_1 + n_2 + \dots + n_{50})}{50} = -3.5$$

$$= 2650 - 50x = 50 \times (-3.5) = -175$$

$$50x = 2875$$

$$x = \frac{2875}{50} = 56.5$$

So, mean of the given numbers will be 56.5

Question: 23

The mean of the f

Solution:

Given: Mean = 8

X	Y	$X \times Y$
3	6	18
5	8	40
7	15	105
9	P	9p
11	8	88
13	4	52
	$\Sigma y = 41 + p$	$303 + 9p$

$$\text{Mean} = \frac{\Sigma xy}{\Sigma y}$$

$$= 8 = \frac{303 + 9p}{41 + p}$$

On cross multiplying both the sides we get,

$$= 303 + 9p = 8(41 + p)$$

$$= 303 + 9p = 328 + 8p$$

$$= 9p - 8p = 328 - 303$$

$$= p = 25$$

Question: 24

The runs scored b

Solution:

Arrange the scored runs in ascending order, we get,

0, 13, 15, 20, 27, 29, 31, 34, 43, 50, 56

Here, $N = 11$ (odd)

Hence,

$$\text{Mean value} = \text{value of } \frac{N+1}{2} \text{ term} = \frac{11+1}{2} = 6^{\text{th}} \text{ term} = 29$$

Question: 25

The weight of 10

Solution:

Arrange the weights in ascending order, we get,

31, 35, 36, 38, 40, 44, 50, 52, 55, 60

Here, $N = 10$ (even)

Hence,

$$\text{Mean weight} = \text{value of } \frac{1}{2} \left[\text{value of } \frac{N}{2} \text{ term} + \text{value of } \left(\frac{N}{2} + 1 \right) \text{ term} \right]$$

$$= \frac{1}{2} [40 + 44]$$

$$= \text{Mean weight} = \frac{84}{2}$$

$$\therefore \text{Mean weight} = 42 \text{ kg}$$

Question: 26

The median of the

Solution:

Arrange the numbers in ascending order, we get,

3, 4, 4, 5, 6, 7, 7, 7, 12.

Here, $N = 9$ (odd)

Hence,

$$\text{Median} = \text{value of } \frac{N+1}{2} \text{ term} = \frac{11+1}{2}$$

$$= 5^{\text{th}} \text{ term which is 6.}$$

Question: 27

The median of the

Solution:

Arrange the given numbers in ascending order,

We get,

22, 34, 39, 45, 54, 54, 56, 68, 78, 84

Here, $N = 10$ (even)

Hence,

$$\text{Median} = \frac{1}{2} [\text{value of 5th term} + \text{value of 6th term}]$$

$$= \frac{1}{2} [54 + 54] = \frac{108}{2} = 54$$

Question: 28

Mode of the data

Solution:

Let's prepare a table,

x	Frequency
14	4
15	5
16	1
17	1
18	1
19	2
20	1

Mode is the number which appeared maximum numbers of times.

In this given series 15 has the highest frequency,

So,

Mode = 15

Question: 29

For drawing a fre

Solution:

When we draw a frequency polygon of a continuous frequency distribution, we need to plot the class marks of the given classes on the x-axis.

Question: 30

The marks obtaine

Solution:

Formula of range = maximum value - minimum value

So, we have,

$$\text{Maximum marks} = 100$$

$$\text{Minimum marks} = 46$$

$$\text{Range} = 100 - 46 = 54$$

Question: 31

The class mark of

Solution:

Formula to calculate the class mark, $= \frac{1}{2} [\text{Upper class limit} + \text{lower class limit}]$

$$\text{Upper class} = 150$$

$$\text{Lower class} = 130$$

So, we get,

$$= \frac{1}{2} [150 + 130] = \frac{280}{2}$$

$$= 140$$

Question: 32

The mean of five

Solution:

Given,

$$\text{The mean of five numbers} = 30$$

Now to calculate the sum of these five numbers we have to multiply the mean by 5,

So, we get,

$$\text{Sum of five numbers} = 5 \times 30 = 150$$

Change in the mean when one number is excluded, it become $= 28$

$$\text{Sum of remaining four numbers} = 4 \times 28 = 112$$

Now to find out the excluded number we have to subtract the sum of four numbers from the sum of five numbers,

We get,

$$\text{The excluded number} = \text{sum of five numbers} - \text{sum of four numbers}$$

$$= 150 - 112 = 38$$

Question: 33

The median of the

Solution:

$$\text{Given data} = 8, 9, 12, 18, (x + 2), (x + 4), 30, 31, 34, 39$$

$$\text{We have } n = 10 \text{ (even)}$$

$$\text{Median} = \frac{1}{2} [\text{Value of } (n/2)\text{th term} + (n/2 + 1)\text{th term}]$$

$$\text{Now, Median} = 24 \text{ (given)}$$

$$24 = \frac{1}{2} [\text{Value of } 5^{\text{th}} \text{ term} + \text{Value of } 6^{\text{th}} \text{ term}]$$

$$24 \times 2 = (x + 2) + (x + 4)$$

$$48 = 2x + 6$$

$$48 - 6 = 2x$$

$$42 = 2x$$

So,

$$x = 42/2 = 21$$

Question: 34

The question cons

Solution:

Let suppose 15 numbers are $= n_1, n_2, \dots, n_{15}$

$$\text{Mean} = \frac{n_1 + n_2 + \dots + n_{15}}{15}$$

Given mean = 25

$$25 = \frac{n_1 + n_2 + \dots + n_{15}}{15}$$

$$= n_1 + n_2 + \dots + n_{15} = 25 \times 15$$

$$= n_1 + n_2 + \dots + n_{15} = 375 \dots [\text{equation (i)}]$$

After subtracting 6 from each number the mean = 19

So, we have,

$$(n_1 - 6), (n_2 - 6), \dots, (n_{15} - 6)$$

$$\Rightarrow \text{Mean} = \frac{(n_1 - 6) + (n_2 - 6) + \dots + (n_{15} - 6)}{15}$$

$$\Rightarrow \text{Mean} = \frac{(n_1 + n_2 + \dots + n_{15}) - 6 \times 15}{15}$$

$$\Rightarrow \text{Mean} = \frac{n_1 + n_2 + \dots + n_{15}}{15} - \frac{6 \times 15}{15}$$

From equation (i)

$$\Rightarrow \text{Mean} = \frac{375}{15} - \frac{6 \times 15}{15}$$

$$= \text{Mean} = 25 - 6 = 19$$

It means assertion (A) is true,

Reason (R) \Rightarrow by empirical formula which is,

Mode = 3(median) - 2(mean) is true.

But Reason (R) is not correct explanation of assertion (A).

Question: 35

The question cons

Solution:

By arranging the data in ascending form, we get,

51, 55, 58, 60, 62, 64, 65, 68, 70, 75, 80, 82, 85, 90, 95

Here, $n = 15$ (odd)

Median = value of $\frac{n+1}{2}$ th term

= Value of 8th term

= 68

Means assertion is correct

Reason (R) is true and it is also the correct explanation of assertion (A).

Question: 36

The mode of the d

Solution:

Arrange the data in ascending form, we get,

2, 3, 3, 9, 9, 9, 16

In this given data 9 appears maximum numbers of time.

Mode = 9

Given mode = 16

So, the given statement is false.

Question: 37

The median of 3,

Solution:

By arranging the data in ascending form, we get,

3, 5, 14, 18, 20

Median = value $[(n + 1)/2$ the term]

Median = value of 3rd term

Median = 14

Given median = 18

So, the given statement is false.

Question: 38

The median of 1,

Solution:

By arranging the data in ascending form, we get,

1, 1, 2, 3, 4, 5, 6, 7, 8, 9

$n = 10$ (even)

Median = $1/2$ [Value of $(n/2)$ th term + $(n/2 + 1)$ th term]

= $1/2$ [value of 5th term + value of 6th term]

= $1/2$ (4 + 5)

= $9/2 = 4.5$

Given median = 7

So, the given statement is false.

Question: 39

Match the followi

Solution:

(A) \rightarrow (q),

(B) \rightarrow (r),

(C) \rightarrow (s),

(D) \rightarrow (p)

Explanation:

(A) First 10 odd numbers are = 1, 3, 5, 7, 9, 11, 13, 15, 17, 19

Sum of these numbers = $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 = 100$

$n = 10$

Mean = $100/10 = 10$

(B) First 10 even numbers are = 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Sum of these numbers = $2 + 4 + 6 + 8 + 10 + 12 + 14 + 16 + 18 + 20 = 110$

$n = 10$

Mean = $110/10 = 11.0$

(C) First 10 prime numbers are = 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

Sum of these numbers = $2 + 3 + 5 + 7 + 11 + 13 + 17 + 19 + 23 + 29 = 129$

$n = 10$

Mean = $129/10 = 12.9$

(D) First 10 composite numbers are = 4, 6, 8, 9, 10, 12, 14, 15, 16, 18

Sum of these numbers = $4 + 6 + 8 + 9 + 10 + 12 + 14 + 15 + 16 + 18 = 112$

$n = 10$

Mean = $112/10 = 11.2$

Question: 40

The class marks o

Solution:

Class marks of the given frequency distribution are = 47, 52, 57, 62, 67, 72, 77

(i) Class size = $52 - 47 = 5$

(ii) Class size = 5

Mid value = $\frac{5}{2} = 2.5$

Class marks = 52

Upper class limit = $52 + 2.5 = 54.5$

Lower class limit = $52 - 2.5 = 49.5$

(iii) Here classes are in the exclusive form,

So true class limit for class mark 52 is $49.5 - 54.5$

Question: 41

Which is false?

Solution:

(A) When n is odd then formula for median is = Value of $\left(\frac{n}{2} + 1\right)$ th term

So, the given statement is true.

(B) When n is even then formula for median become;

Median = $1/2$ [value of $(n/2)$ th term + value of $(n/2 + 1)$ th term]

So, the given statement is true.

(C) Mode is the number or item which occur maximum numbers of time or which have the highest frequency.

So, the given statement is true.

(D) The correct formula is;

$$\text{Mode} = 3(\text{median}) - 2(\text{mean})$$

So, the given statement is false.

Question: 42

Which is false?

Solution:

(A) Given,

$$\bar{x} = \frac{x_1 + x_2 + \dots + x_n}{n} \dots (i)$$

Now take L.H.S

$$\Rightarrow \sum_{i=1}^n (x_i - \bar{x})$$

$$\Rightarrow (x_1 - \bar{x}) + (x_2 - \bar{x}) + \dots + (x_n - \bar{x})$$

$$\Rightarrow (x_1 + x_2 + \dots + x_n) - n\bar{x}$$

$$\Rightarrow n\bar{x} - n\bar{x} [\because x_1 + x_2 + \dots + x_n = n\bar{x}, \text{from equation (i)}]$$

$$\sum_{i=1}^n (x_i - \bar{x}) = 0$$

So, given statement is true.

(B) Given,

$$\bar{x} = \frac{x_1 + x_2 + \dots + x_n}{n} \dots (i)$$

Observations are $= (x_1 + a), (x_2 + a), \dots, (x_n + a)$

$$= \text{Mean} = \frac{(x_1 + a) + (x_2 + a) + \dots + (x_n + a)}{n}$$

$$\Rightarrow \text{Mean} = \frac{x_1 + x_2 + \dots + x_n + n \times a}{n}$$

$$\Rightarrow \text{Mean} = \frac{x_1 + x_2 + \dots + x_n}{n} + \frac{n \times a}{n}$$

From equation (i) we get,

$$\text{Mean} = (\bar{x} + a)$$

So, given statement is true.

$$(C) \text{ Mean of } x_1, x_2, \dots, x_n = \frac{x_1 + x_2 + \dots + x_n}{n}$$

Given mean $= \bar{x}$

$$\bar{x} = \frac{x_1 + x_2 + \dots + x_n}{n} \dots (i)$$

Observations are $= ax_1, ax_2, \dots, ax_n$

$$= \text{Mean} = \frac{ax_1 + ax_2 + \dots + ax_n}{n}$$

$$\Rightarrow \text{Mean} = \frac{a(x_1 + x_2 + \dots + x_n)}{n}$$

$$\therefore \text{Mean} = a\bar{x} \dots [From equation (i)]$$

So, the given statement is true.

(D) Let suppose the observations are $= \bar{X}_1, \bar{X}_2, \dots, \bar{X}_n$

$$\frac{x_1 + x_2 + \dots + x_n}{n} \dots\dots\dots (\text{Given})$$

$$\text{Sum} = \bar{X}_1 + \bar{X}_2 + \dots + \bar{X}_n = nM \dots\dots\dots (i)$$

And

$$ax_1 + ax_2 + \dots\dots\dots + ax_n = aM$$

Then,

$$\frac{na + (x_1 + x_2 + \dots + x_n)}{n} = aM$$

$$\frac{na + nM}{n} = aM \text{ [from equation (i)]}$$

$$= \frac{n(a + M)}{n} = aM$$

$$a + M = aM \text{ (Which is not true)}$$

Question: 43

Which is false?

Solution:

(A) Given observations are $= 4, 6, x, 8, 10, 13$

$$\text{Mean} = \frac{\text{Sum of the observations}}{\text{No. of observation}}$$

Now, given mean $= 8$

$$8 = \frac{4 + 6 + x + 8 + 10 + 13}{6}$$

$$\text{Sum of the observations} = 4 + 6 + x + 8 + 10 + 13 = 8 \times 6$$

$$= 41 + x = 48$$

$$\therefore x = 48 - 41 = 7$$

$$\text{So, } x = 7$$

The given statement is true.

(B) Given array $= 59, 62, 65, x, x + 2, 72, 85, 99$

$$n = 8 \text{ (even)}$$

$$\text{Median} = 1/2 [\text{value of } (n/2)\text{th term} + \text{value of } (n/2 + 1)\text{th term}]$$

$$= 1/2 [\text{value of 4th term} + \text{value of 5th term}]$$

$$\text{Median} = \frac{1}{2} [x + (x + 2)] = \frac{2x + 2}{2}$$

$$\text{Given median} = 67$$

$$67 = \frac{2x + 2}{2} \Rightarrow 2x + 2 = 67 \times 2$$

$$2x + 2 = 134$$

$$2x = 134 - 2$$

$$X = \frac{132}{2} = 66$$

$$\text{So, } x = 66$$

The given statement is true

(C) Given,

Observations are = 1, 3, 5, 7, 5, 2, 7, 5, 9, 3, p, 11

Mode = 5

Value of p = 7

We know that mode is the item which has highest frequency and in given statement 5 is the mode. If p = 7 then it will become the number with highest frequency. It means p can't be equals to 7 as mode is 5.

So, the given statement is false.

(D) Given;

Mean of 10 observations = 15

Mean of 15 observations = 18

Mean of all 25 observation = 16.8

Now the sum of the observations;

Sum of 10 observations = $10 \times 15 = 150$

Sum of 15 observation = $15 \times 18 = 270$

Sum of 25 observation = Sum of 10 observations + Sum of 15 observations

Mean of 25 observations = $\frac{\text{Sum of 25 observation}}{\text{No. of observations}}$

$$= \text{Mean} = \frac{150 + 270}{25}$$

$$= \text{Mean} = 420/25$$

$$\therefore \text{Mean} = 16.8$$

So, the given statement is true.

Exercise : FORMATIVE ASSESSMENT (UNIT TEST)

Question: 1

Look at the table

Solution:

The given class interval is in the form of inclusive form.

To find out the true lower limit of the class we need to draw the table in continuous frequency distribution in exclusive form.

Marks	Frequency
- 0.5 - 10.5	6
10.5 - 20.5	9
20.5 - 30.5	11
30.5 - 40.5	4

So, as we can see that true lower limit of class 21 - 30 is 20.5

Question: 2

Look at the table

Solution:

As the class intervals are given in exclusive form so the true upper class limit of the class 10 - 20 is 20.

Question: 3

Look at the table

Solution:

The given class interval is in the form of inclusive form.

To find out the class size we need to first find out the true class limits.

Now,

By converting the table in exclusive form;

We get,

Marks	Frequency
- 0.5 - 10.5	7
10.5 - 20.5	8
20.5 - 30.5	10
30.5 - 40.5	5

Class size = True upper limit - True lower limit

Class size = 20.5 - 10.5 = 10

Question: 4

What is the class

Solution:

Class Interval = 21 - 30 (given)

Upper class limit = 30

Lower class limit = 21

Class marks = $\frac{1}{2}$ [upper limit + lower limit]

Class marks = $\frac{1}{2}$ [30 + 21]

\therefore Class marks = $\frac{51}{2} = 25.5$

Question: 5

If the mean of fi

Solution:

Observations are = x, x + 2, x + 4, x + 6, x + 8

No. of observations = 5

$$\text{Mean} = \frac{\text{Sum of observations}}{\text{No. of observations}}$$

Given mean = 11

$$\Rightarrow 11 = \frac{x + (x + 2) + (x + 4) + (x + 6) + (x + 8)}{5}$$

$$\Rightarrow x + x + 2 + x + 4 + x + 6 + x + 8 = 11 \times 5$$

$$\Rightarrow 5x + 20 = 55$$

$$\Rightarrow 5x = 55 - 20$$

$$x = \frac{35}{5} = 7$$

So, value of x = 7.

Question: 6

The points scored

Solution:

Arrange the scores in ascending order;

Scores are = 2, 5, 7, 7, 8, 8, 10, 10, 14, 15, 17, 18, 24, 28, 48

Total points = 16 (even)

Median = $\frac{1}{2}$ [value of $(n/2)$ th term + value of $(n/2 + 1)$ th term]

= Median = $\frac{1}{2}$ [value of 8th term + value of 9th term]

= Median = $\frac{1}{2}$ [10 + 14]

\therefore Median = $24/2 = 12$

The median of the points scored by the team is 12.

Question: 7

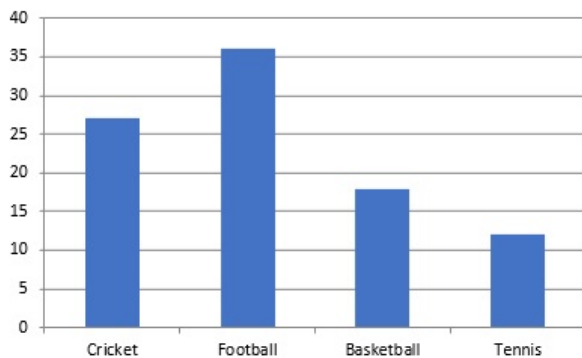
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Solution:

To draw the bar graph,

On x-axis take the games and on y-axis take the no. of students.

Now draw the bar graph;

**Question: 8**

The heights of fi

Solution:

Heights of the players = 148cm, 154cm, 153cm, 140cm, 150cm

Number of players = 5

Mean height per player = $\frac{\text{Sum of heights}}{\text{No. of players}}$

$$\Rightarrow \text{Mean} = \frac{148 + 154 + 153 + 140 + 150}{5}$$

$$\Rightarrow \text{Mean} = \frac{745}{5}$$

\therefore Mean = 149cm

So, mean height per player is 149cm.

Question: 9

The marks obtaine

Solution:

By arranging the marks in ascending order, we have;

5, 10, 19, 20, 23, 23, 23, 34, 36, 37, 38

In the given data 23 occurred the maximum number of times,

So, the model mark = 23

Question: 10

The class marks o

Solution:

To find true class limit should know the class size;

$$\text{Class size} = 31 - 26 = 5$$

$$\text{Mid value} = 5/2 = 2.5$$

When class mark is 26;

$$\text{Upper class limit} = 26 + 2.5 = 28.5$$

$$\text{Lower class limit} = 26 - 2.5 = 23.5$$

When class mark is 31;

$$\text{Upper class limit} = 31 + 2.5 = 33.5$$

$$\text{Lower class limit} = 31 - 2.5 = 28.5$$

When class mark is 36;

$$\text{Upper class limit} = 36 + 2.5 = 38.5$$

$$\text{Lower class limit} = 36 - 2.5 = 33.5$$

When class mark is 41;

$$\text{Upper class limit} = 41 + 2.5 = 43.5$$

$$\text{Lower class limit} = 41 - 2.5 = 38.5$$

When class mark is 46;

$$\text{Upper class limit} = 46 + 2.5 = 48.5$$

$$\text{Lower class limit} = 46 - 2.5 = 43.5$$

When class mark is 51;

$$\text{Upper class limit} = 51 + 2.5 = 53.5$$

$$\text{Lower class limit} = 51 - 2.5 = 48.5$$

So, true class limits are;

23.5 - 28.5, 28.5 - 33.5, 33.5 - 38.5, 38.5 - 43.5, 43.5 - 48.5, 48.5 - 53.5

Question: 11

The mean of the f

Solution:

First draw the table as shown below;

x	f	f × x
3	6	18
5	8	40
7	15	105
9	p	9p
11	8	88
13	4	52
	$\Sigma f = 41 + p$	$\Sigma fx = 303 + 9p$

$$\Rightarrow \text{Mean} = \frac{\Sigma fx}{\Sigma f}$$

Given mean = 8

$$8 = \frac{303 + 9p}{41 + p}$$

$$= 8(41 + p) = 303 + 9p$$

$$= 328 + 8p = 303 + 9p$$

$$= 9p - 8p = 328 - 303$$

$$= p = 25$$

So, the value of $p = 25$

Question: 12

If 10, 13, 15, 18

Solution:

10 observations in ascending order = 10, 13, 15, 18, $x + 1$, $x + 3$, 30, 32, 35, 41

$n = 10$ (even)

Median = $1/2$ [value of $(n/2)$ th term + value of $(n/2 + 1)$ th term]

Median = $1/2$ [value of 5th term + value of 6th term]

Median = $1/2 [(x + 1) + (x + 3)] = (2x + 4)/2$

Given median = 24

$$= 24 = \frac{2x+4}{2}$$

$$= 2x + 4 = 24 \times 2$$

$$= 2x + 4 = 48$$

$$= 2x = 48 - 4 = 44$$

$$= x = 44/2 = 22$$

Question: 13

Calculate the mod

Solution:

By arranging the given data in ascending form we get;

10, 10, 11, 11, 12, 12, 13, 14, 15, 17

Draw the table;

X	f	Cumulative frequency	f × x
10	2	2	20
11	2	4	22
12	2	6	24
13	1	7	13
14	1	8	14
15	1	9	15
17	1	10	17
	$\Sigma f = 10$		$\Sigma fx = 125$

$$\Sigma f = N = 10 \text{ (even)}$$

$$\text{Median} = 1/2 [\text{value of } (n/2)\text{th term} + \text{value of } (n/2 + 1)\text{th term}]$$

$$= 1/2 [\text{value of 5th term} + \text{value of 6th term}]$$

$$= 1/2 [12 + 12] = 24/2 = 12$$

Now,

$$\text{Mean} = (\sum fx)/(\sum f) = 125/10 = 12.5$$

$$\text{Mode} = 3(\text{median}) - 2(\text{mean})$$

$$= 3 \times 12 - 2 \times 12.5$$

$$= 36 - 25 = 11$$

Question: 14

Find the medium o

Solution:

Arrange the data in ascending form:

Variables	3	6	7	10	12	15
Frequency	3	4	13	2	8	10

Draw the cumulative frequency table;

Variables(x)	Frequency(f)	Cumulative frequency
3	3	3
6	4	7
7	13	20
10	2	22
12	8	30
15	10	40
	$\sum f = 40$	

$$\sum f = N = 40 \text{ (even)}$$

$$\text{Median} = 1/2 [\text{value of } (n/2)\text{th term} + \text{value of } (n/2 + 1)\text{th term}]$$

$$= 1/2 [\text{value of 20th term} + \text{value of 21st term}]$$

$$= 1/2 [7 + 10] = 17/2 = 8.5$$

Question: 15

The mean of six n

Solution:

Let suppose the numbers are $= n_1, n_2, n_3, n_4, n_5, n_6$

$$\Rightarrow \text{Mean} = \frac{n_1 + n_2 + n_3 + n_4 + n_5 + n_6}{6}$$

Given mean = 23

So,

$$\therefore \frac{n_1 + n_2 + n_3 + n_4 + n_5 + n_6}{6} = 23$$

$$n_1 + n_2 + n_3 + n_4 + n_5 + n_6 = 23 \times 6 = 138 \dots\dots\dots(i)$$

Let suppose excluded number be n_4

$$N = 5$$

$$\text{Mean of remaining numbers} = \frac{n_1 + n_2 + n_3 + n_5 + n_6}{5} = 20 \text{ (given)}$$

$$n_1 + n_2 + n_3 + n_5 + n_6 = 20 \times 5 = 100 \dots\dots\dots(ii)$$

Subtract the (ii) equation from (i) equation

We get;

$$n_4 = 138 - 100 = 38$$

So, the excluded number is 38.

Question: 16

Fill in the blank

Solution:

Cumulative frequency is the total of frequency.

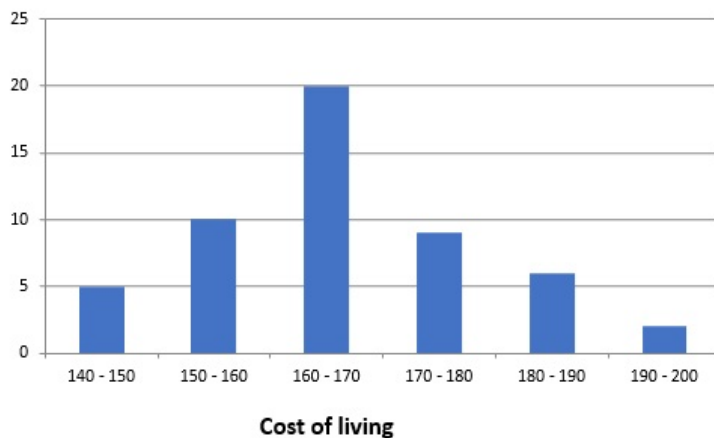
Marks	Frequency	Cumulative frequency
0-5	3	3
5-10	5	8
10-15	8	16
15-20	4	20

Question: 17

In the city, the

Solution:

Draw the histogram with the help of given data.



Question: 18

The mean of the m

Solution:

Calculated mean of marks of 50 students = 39

According to the given mean the sum of these marks will be = $39 \times 50 = 1950$

Correct sum will be = incorrect sum + (correct marks - incorrect marks)

$$= 1950 + 43 - 23$$

$$= 1993 - 23 = 1970$$

$$\text{Correct mean} = (\text{correct sum})/50 = 1970/50 = 39.4$$

So, the correct mean is 39.4

Question: 19

The following tab

Solution:

Draw the table;

Weight(x)	No. of workers	Fx
60	4	240
63	3	189
66	2	172
69	2	138
72	1	72
	$\Sigma f = 12$	$\Sigma fx = 771$

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f}$$

$$\Sigma f = 12, \Sigma fx = 771$$

$$\text{Mean} = \frac{771}{12} = 64.25\text{kg}$$

The mean weight is 64.25kg

Question: 20

The heights (in c

Solution:

Height	151	152	153	154	155	156	157
No of students	6	3	12	4	10	8	7

Draw the cumulative frequency table;

Heights (in cm) (x)	No. of students (f)	Cumulative frequency
151	6	6
152	3	9
153	12	21
154	4	25
155	10	35
156	8	43
157	7	50

$$N = \sum f = 50 \text{ (even)}$$

$$\text{Median} = 1/2 [\text{value of } (n/2)\text{th term} + \text{value of } (n/2 + 1)\text{th term}]$$

$$\Rightarrow \text{Median} = 1/2 [\text{value of 25th term} + \text{value of 26th term}]$$

$$\Rightarrow \text{Median} = 1/2 [154 + 155] = 309/2 = 154.5\text{cm}$$